PC WORLD

LOTUS EDITION

June 1993 $3.95

486 PCs for $1000

1993 WORLD CLASS AWARDS!
$50,000 IN PRIZES

At Last! A Great 1-2-3 For Windows

50 Super Spreadsheet Tips

Easy 1-2-3 Macros for Budgets

HP's New Low-Cost Laser Printer

Pardon us, but would you mind if we sat right here on your desk, a mere two feet away from you, for the next few thousand hours?

Easy to live with. Easier to afford.

The new NEC MultiSync FG "e" monitors.

We realize that's a lot to ask. And we kept that firmly in mind when we created our new MultiSync® FGe™ monitors.

More monitor for less money.

For less than you'd expect, they give

you everything you ever wanted in a monitor.

Big, roomy screens—15" for our 3FGe and 4FGe, 17" for our 5FGe*—provide plenty of space for Windows and multimedia video. Higher refresh rates deliver even crisper, steadier images. They also offer broader compatibility with PC and Mac® platforms, including IBM®'s XGA®-2 standard. Compliance with strict Swedish MPR II emissions guidelines. Even, a new 3-year limited warranty.

All for a price that's nothing short of phenomenal for monitors this great.

The image you deserve.

Above all, they give you image quality so sharp, colorful and bright, it'll give your work a whole new focus.

For more on the amazing MultiSync FGe monitors, call 1-800-NEC-INFO. In Canada, 1-800-343-4418. For details via fax call NEC FastFacts™, 1-800-366-0476, and request document 1521.

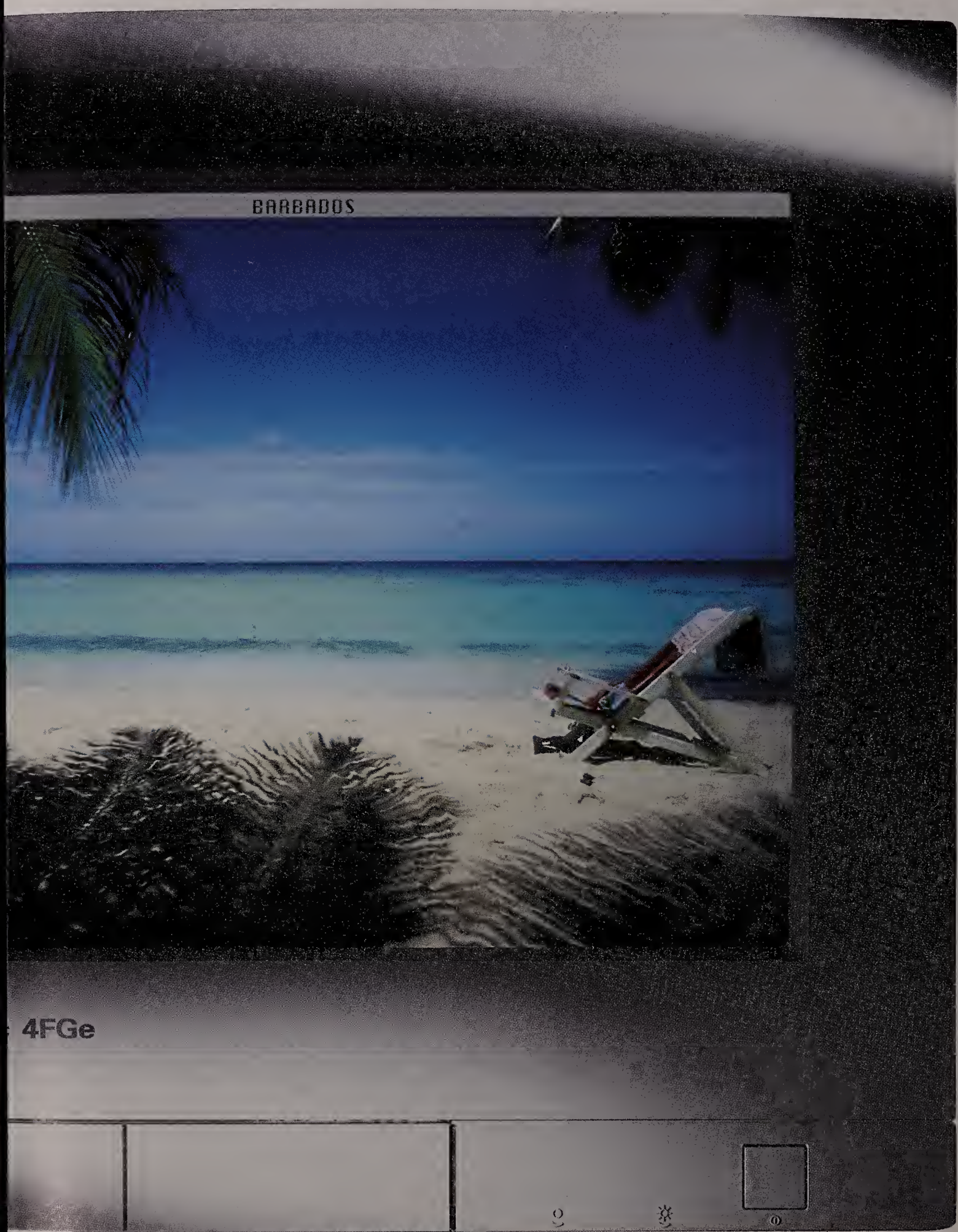
Thank you for inviting us onto your desktop.

Because ⬆ is the way you want to go.

NEC

Circle 201 on reader service card

But it'll be okay.



In our new FGe series, the "e" is for ergonomics. And economics. They're easy to use, easy to live with-- the way NEC monitors have always been. They're also easier to afford.

* 15" and 17" CRTs yield 13.8" and 15.6" active display areas. MultiSync is a registered trademark and FGe and FastFacts are trademarks of NEC Technologies, Inc. All other trademarks are the property of their respective owners. ©1993 NEC Technologies, Inc.

It'll BE in your face

All day Every DAY

PC WORLD

LOTUS EDITION

Cover Story

100 486s for $1250
Holding out for rock-bottom prices before plunking down the cash for a 486? Now's the time to act. Dozens of systems have hit the $1250 mark, with some pushing $1000. We pick the best of 25 PCs with a variety of 486 processors.

Spreadsheets

134 50 Spreadsheet Tips
You've mastered the basics—now join the ranks of accomplished spreadsheet jockeys with these power-packed tips for *Excel*, *Quattro Pro*, and *1-2-3*.

Windows

161 Windows NT: The New DOS?
NT blends the best of DOS and *Windows:* stability, robust multitasking, better networking, and *Windows'* familiar interface. Is it finally time to ditch DOS?

178 Word Processor or Desktop Publisher?
The debate: whether *Windows* word processors stand up to low-end desktop publishers for creating simple reports, brochures, and newsletters. We test six packages to find the smart choice.

Lotus: Get the Most From 1-2-3

98-L6 Add Graphics to Your Worksheet for Greater Impact
Beef up your spreadsheet presentations with charts, clip art, and other enhancements created with *1-2-3*'s Graph Edit command.

98-L13 Presenting 1-2-3...With Freelance
For putting together more sophisticated presentations of *1-2-3* data, here's how to harness the power of *Freelance Graphics*.

98-L19 Speed Your Planning and Forecasting
Three quick *1-2-3* macros help take the drudgery out of budgeting.

98-L22 Notes 3.0 Brings More Power to the Group
Lotus's information-sharing environment now lets you move beyond simple databases and E-mail to more accessible, powerful applications.

98-L1 Editor's Page
98-L2 News
98-L29 Improving Your Skills
98-L33 Macro Basics
98-L35 Advanced Macros
98-L39 Q&A

Cover photograph by Robert Cardin, digital composition by Varitei Select

Top of the News

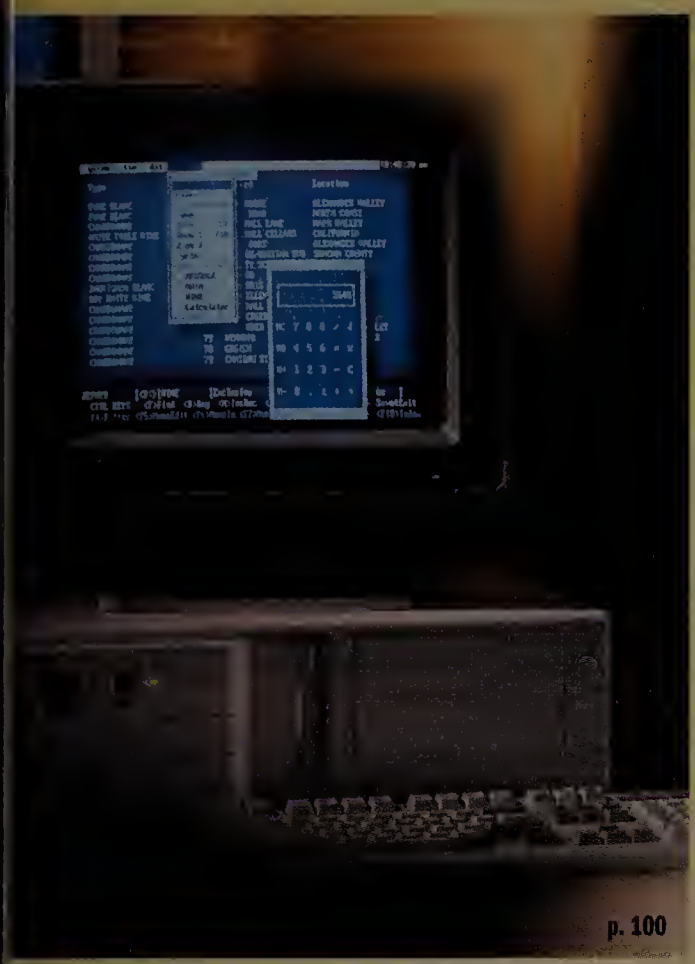
42 1-2-3 Leapfrogs Excel and Quattro
1-2-3 4.0 for Windows is a winner. For those eager to trade up, the wait is over.

48 In Touch on the Go
Hewlett-Packard's 100LX includes a version of *cc:Mail* for mobile E-mail.

50 HP's LaserJet 4L Makes Itself at Home
For home or office, this compact printer fits right into your work style.

54 cc:Mail for Windows Plays by Your Rules
Now you can tell your E-mail where to go! Automatically forward, store, or reply to messages in version 2.0.

56 How to Survive if Your PC Maker Doesn't
Don't be left unprepared if your PC vendor goes out of business.



p. 100

188 Databases Come to Windows
A database that's easy to use? That's the preposterous claim of *FileMaker Pro*, *Microsoft Access*, and other new *Windows* databases vying for your attention. To see if a graphical interface finally makes it easier to manage information, we review seven newcomers and choose the best for novices and pros.

Hard Disks/Caches

212 Caches Pay Off
Bundled free with *Windows* and DOS, SmartDrive can ease the strain of *Windows* and disk-intensive tasks. But is SmartDrive all you need for top performance? Here's how to figure out if and when other software and hardware caches make more sense.

1993 World Class Awards

95 Vote and Win!
Cast your vote for the best hardware and software products on the market today, and enter our drawing for $50,000 worth of state-of-the-art prizes. Fill out the official 1993 World Class ballot and mail it today!

p. 95

New Products

69 Zeos Contenda and Micro Electronics WinBook notebook PCs
70 CompuAdd 450SLC2 486 desktop PC
70 Pinnacle RCD-202, RCD-200 CD ROM recorders
72 Packard Bell 486 PCs
72 Maxtor MXL-105-III, MiniStor MiniPort 42/85 PC card hard drives
74 Adobe *Photoshop 2.5 for Windows*
75 MapInfo *Maps&Data*
75 *Microsoft Visual C++ 1.0*
78 Serif *PagePlus 2.0* desktop publisher
78 Asymetrix *Compel 1.0* presentation software
79 Polaris *PackRat 5.0*
79 *askSam for Windows*
80 Artisoft *LANtastic 5.0*
84 Quick Takes
93 Marketplace
Prices for popular PCs nationwide.

PC World™ (ISSN 0737-8939) is published monthly at $29.90 for one year (12 issues), $59.80 for two years (24 issues), $89.70 for three years (36 issues) by PC World Communications, Inc., 501 Second St. #600, San Francisco, CA 94107. Foreign orders must be prepaid in U.S. funds with additional postage. Add $18 per year for Canada and Mexico; add $46 per year for airmail for all other countries. Canadian GST Registration #R124669680. Second-class postage paid at San Francisco and additional mailing offices. POSTMASTER: Send address changes to PC World, Subscription Dept., P.O. Box 55029, Boulder, CO 80322-5029. Editorial and business offices: 501 Second St. #600, San Francisco, CA 94107, 415 243-0500. Copyright © 1993, PC World Communications, Inc. All rights reserved. The following are trademarks of PC World Communications, Inc.: Consumer Watch, Star-Dot-Star, PC World.

Here's How

220 Help Line
224 Spreadsheets
230 Word Processing
236 Windows
240 Data Management
244 Publishing & Presentations
248 Communications
250 Hardware
254 Star-Dot-Star
259 Instant Reference Card
DOS 6.0: Utilities

Departments

19 In This Issue
23 Letters
31 Consumer Watch
37 Real Problems, Real Solutions
293 Business Fixtures
297 Games: Break Time
300 Home Office

Resources

10 PC World Online
246 Coming Up
265 Fax Survey: Fax us your opinions for a chance to win a CD ROM drive.
266 PC World Catalog
277 Advertiser Index
281 Editorial Product Index
282 Mail-Order Shopping Guide

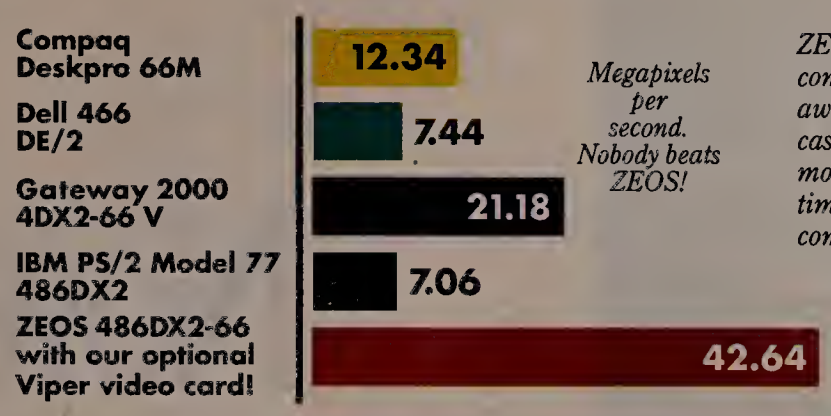
WOW! HIGH-SPEED VESA LOCAL BUS VIDEO!

Local bus is the hottest performance enhancement going. It speeds your computer's performance by allowing peripherals—like video controllers and IDE disk drives—to connect *directly* to the CPU's bus, transferring data at full clock speed.

Your new ZEOS system features *two VESA-standard local bus slots.* VESA-standard is important—you know you won't get stuck with some proprietary architecture that has no future. Check the competition; few meet the standard.

And ZEOS gives you *incredible* local bus video. *PC Magazine* tested a ZEOS system with our optional Viper video card. Their findings? The ZEOS *"blew all competitors away—in some cases performing more than ten times as fast as competitors."* This same #1-rated blazing Windows performance can be yours. Only from ZEOS!

PC MAGAZINE LABS BENCHMARK TESTS: GRAPHICS WINMARK



ZEOS "blew all competitors away—in some cases performing more than ten times as fast as competitors."
–PC Magazine, 1/26/93

NOW: LARGER, FASTER LOCAL BUS HARD DRIVES!

ZEOS.® Your #1

DATA TRANSFER THAT'S OVER TWICE AS FAST. WITH LOCAL BUS IDE!

We take the same local bus technology and apply it to our built-in IDE drive controller. Your drive will be so fast you'll hardly know it's there! Dell doesn't have it; few others do either. ZEOS has it and so can you.

"IT'S HARD TO IMAGINE A BRIGHTER UPGRADE PICTURE." —PC WORLD

Now you can upgrade from any 486 as your needs change. You get more than just an overdrive socket—you get *upgradability all the way to Intel's Pentium™-based OverDrive™ processor.* And your ZIF (Zero Insertion Force) socket makes it so easy!

Yet CPU upgradability is only part of the story. Because you also get *eight expansion slots,* seven of which are open, giving you plenty of room to add to your system later. *And you get Flash BIOS, allowing for easy BIOS upgrades in the future by disk or modem!* Plus on-board SCSI for only $49. Add SCSI devices (such as CD-ROM) now or later and you get high performance on-board SCSI that's *very* affordable.

"AN ARRAY OF FEATURES TO MAKE A USER'S MOUTH WATER." —PC MAGAZINE

If you spend as much time with your PC as we think you do, you know what a difference high-quality components can make. Such as *strong cases, floppy drives by Teac, and .28mm dot pitch SVGA monitors that are non-interlaced all the way up to 1024x768 resolution.*

UL LISTING ON THE *ENTIRE SYSTEM.*

Another rare—and important—symbol of quality is the UL® Listing. We feel it says something about quality as well as safety. And it's *on the entire system* —not just the power supply. Most don't have it. You do.

NOT ONE, BUT TWO COOLING FANS.

While ZEOS systems run cooler than most with just one fan, we still give you two whisper-quiet ones. Because the cooler your system runs, the longer it will last. Particularly with today's high-performance CPUs.

WARRANTIES, GUARANTEES AND MORE.

At ZEOS, we support you *toll free, 24 hours a day, 365 days a year.* Your own ZEOS award-winning Technical Support is only a phone call away—*anytime* you need us.

And if you're not absolutely

SERVICE & RELIABILITY • PC MAGAZINE • READERS' CHOICE

Buy with confidence. We're PC Magazine Readers' Choice for Service and Reliability! ZEOS is the only PC vendor to receive the "Excellent" rating for both desktop and laptop systems.

Circle 258 on reco

convinced your new ZEOS PC is everything we say it is and more, *you have a full 30 days to return it to us for a complete, no-questions-asked refund.* Plus, you're covered by our One Year Limited Warranty, Express Parts Replacement Policy and Complete Customer Satisfaction Package.

FABULOUS FREE SOFTWARE—INCLUDING NEW LOTUS IMPROV!

You get your choice of a popular Windows application from Lotus—1-2-3, Ami Pro, Freelance Graphics, or new Lotus Improv, called the most "revolutionary

NOW: Larger drives, all with high-speed built-in cache. Up to 452MB!

Choice.

and accessible" spreadsheet ever. That's in addition to DOS 6.0 (plus enhanced tools), Windows, and the fabulous new Lotus Organizer—your own personal information manager highly recommended by *PC Magazine*. With all the free software you get with your new ZEOS system, you save hundreds of dollars!

IT ALL COMES DOWN TO VALUE.

No one gives you as much as ZEOS. At any price. And quite frankly, in the history of our company, we've never built better PCs than these. That means a lot from a company with *nine PC Magazine Editors' Choice* awards.

SO GIVE US A CALL!

When it comes right down to it, buying a ZEOS is the best purchase decision you can make. So why not give us a call right now and talk with your own friendly and knowledgeable ZEOS Systems Consultant. ZEOS is absolutely your best choice. And we don't just say it. *We guarantee it!*

CALL NOW TOLL FREE
800-554-5220

Fax Orders: 612-633-1325, Government: 800-245-2449, TDD Orders: 800-228-5389, Outside U.S. and Canada: 612-633-6131. MasterCard, VISA, Am Exp, Discover, Z-Card,℠ COD and Leasing programs. Open 24 Hours a Day, 365 Days a Year!

Purchase orders from Fortune 1000 companies, governments and institutions subject to approval. Leasing programs available. All prices and specifications are subject to change without notice. Please call to confirm pricing, specifications and warranty details. All products and company names are trademarks or registered trademarks of their respective holders. © 1993 ZEOS International, Ltd., 1301 Industrial Blvd., Minneapolis, MN 55413 USA. ZEOS is a publicly traded company. (NASDAQ symbol: ZEOS.) UPGR4GT-PCW-9306

ZEOS® INTERNATIONAL, LTD.

NOBODY GIVES YOU THIS MUCH!

#1	#2	#3	#4	
$1295	$1795	$2195	$2495	486SX-25
1395	1895	2295	2595	486SX-33
1595	2095	2495	2795	486DX-33
1695	2195	2595	2895	486DX2-50
1795	2295	2695	2995	486DX2-66
■	■	■	■	Intel 486 CPU
■	■	■	■	ZIF upgrade socket
2	4	8	16	MB of RAM expandable to 64MB on motherboard
107	214	340	452	High-speed IDE hard drive (MB)
32K	128K	128K	256K	Built-in hard drive cache
■	■	■	■	Local bus IDE hard drive interface
16	16	12	12	Seek time (ms)
■	■	■	■	1.2MB Teac floppy drive
	■	■	■	1.44MB Teac floppy drive
■				ZEOS 14" high-resolution mono VGA monitor
	■	■	■	ZEOS 14" high-resolution 1024x768 non-interlaced SVGA color monitor
.28	.28	.28	.28	Monitor dot pitch (mm)
■	■	■	■	1MB high-speed VESA local bus card with Windows accelerator
■	■	■	■	Eight expansion slots including two VESA local bus
■	■	■	■	Two serial ports, one parallel port
■	■	■	■	Shadow RAM/EMS support
■	■	■	■	Socket for optional on-board SCSI
■	■	■	■	Flash BIOS
■	■	■	■	High-capacity 200W power supply and built-in surge suppression
■	■	■	■	ZEOS SpaceSaver case with six drive bays
■	■	■	■	Two cooling fans
■	■	■	■	ZEOS 101-key tactile/click keyboard
■	■	■	■	Microsoft DOS 6.0 (plus enhanced tools)
	■	■	■	Microsoft Windows
	■	■	■	Microsoft Mouse
	■	■	■	Choice of Lotus Improv, 1-2-3, Ami Pro or Freelance
	■	■	■	Lotus Organizer
■	■	■	■	24-Hour-A-Day Toll-Free Technical Support
■	■	■	■	30-Day Money-Back Guarantee
■	■	■	■	One Year Limited Warranty

er service card

ZEOS® PCs are your best choice.

But don't take our word for it:

"...blew all competitors away—in some cases performing more than ten times as fast as competitors."

–*PC Magazine*, January 26, 1993

"ZEOS' engineering and quality advantages... clearly distinguish the ZEOS product from similarly priced machines."

–*Forbes*, March 1, 1993

"An array of features to make a user's mouth water."

–*PC Magazine*, January 26, 1993

Take Theirs.

"The ZEOS is the fastest 33-MHz 486-DX system we tested, and its performance even topped that of two 50-MHz 486DX2s."

–*PC World*, February 1993, Best Buy

"This is a fast, beautifully designed PC with an upgrade path that just won't quit. That spells Best Buy to us."

–*PC World*, February 1993, Best Buy

"Kudos for its excellent motherboard design, great performance, and thoughtful little extras...These features set the ZEOS apart from the crowd."

–*PC Computing*, March 1993, Best Value

"...look at ZEOS's new 486DX2-66... That's value pricing."

–Jim Seymour, *PC Magazine*, Feb. 9, 1993

Circle 258 on reader service card

Your ZEOS® Now with 386SL

"...if you're looking for a subnotebook and want to make next to no compromises, then the $1495 ZEOS Contenda is your best bet."

—*PC Week*, February 1, 1993

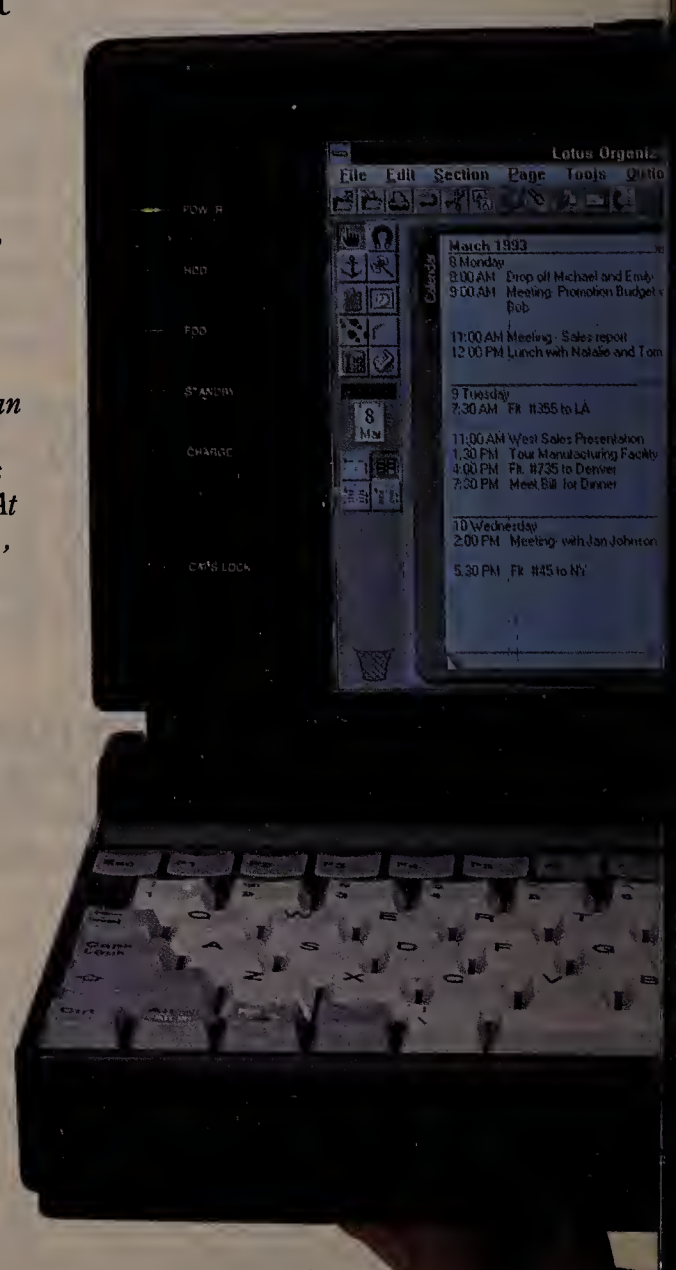
PC Week calls the ZEOS Contenda "the best yet of the new crop of lightweight, full-featured machines." We weren't satisfied with "best yet"—so we've made it *even better.* Because now you get your choice of a 386SL or 486SL CPU!

FEATURES THAT PULL NO PUNCHES.

Start by checking out the 386SL. The specs are on the left. It's impossible to find a notebook on the market today that's this light, this small, this affordable—and still gives you *so much power.* But it's all here.

For instance, there's the smart SL processor. According to *PC Magazine,* when it comes to notebooks, look for Intel's SL processor. The ZEOS Contenda's CPU extends your battery life significantly—because it's intelligent enough to power-down the memory, disks, modem and more when they're not in use.

What's more, its features make it a pleasure to use. Such as a crisp, vibrant VGA backlit screen. A built-in track ball. Enough power and memory to easily run Windows. And at less than 4 pounds in weight, it's probably lighter than your briefcase!



Smaller than a notebook, powerful as a desktop. At only 3.9 lbs., the ZEOS Contenda keeps you light on your feet.

386SL CONTENDA PACKAGE I:

$1495

- CPU: Intel 386SL
- Processor Speed: 25MHz
- Memory: 2MB expandable to 10MB
- Hard Drive: 80MB
- Display: VGA backlit, 640x480, .23mm dot pitch, 256K video RAM, Sharp 7.4" diagonal, up to 64 shades of gray
- Battery: NiMH; operating time up to 4 hours; a snap to remove
- Size: 9.7" x 6.1"
- Weight: Only 3.9 lbs.
- Power Management: Fully featured, including Deturbo, Standby and Suspend to disk
- Keyboard: Comfortable 80-key with embedded numeric keypad
- I/O Ports: 1 serial and 1 parallel standard; ports for optional internal modem, external 3.5" floppy and external color VGA or SVGA monitor
- Pointing Device: Easy-to-use built-in trackball
- Warranties & Guarantees: ZEOS award-winning 24-Hour Toll-Free Technical Support, 30-Day Absolute Satisfaction Money-Back Guarantee, complete Customer Satisfaction Package

386SL CONTENDA PACKAGE II:

$1795

We take Pkg. I and upgrade to 4MB RAM, add an external 3.5" floppy drive, DOS, Windows and Lotus Organizer!

386SL CONTENDA PACKAGE III:

$1995

All of pkg. II plus a nylon carrying case, extra battery, and internal 9600/2400 baud fax modem. The whole enchilada for less than $2000!

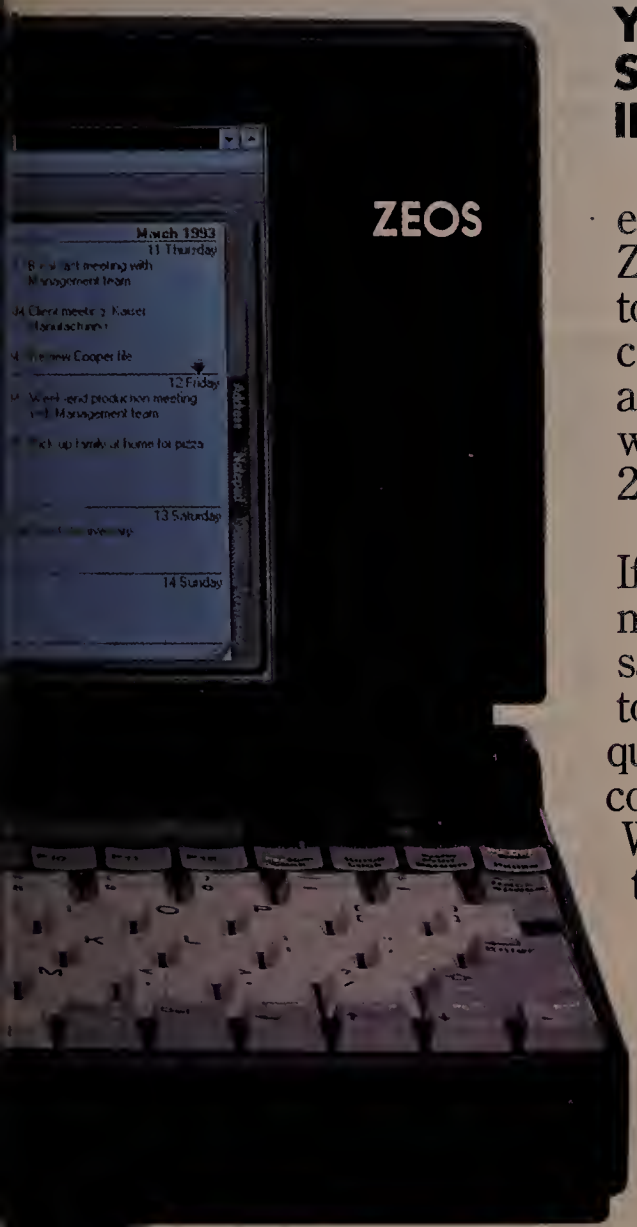
Purchase orders from Fortune 1000 companies, governments and institutions subject to approval. Leasing programs available. All prices and specifications are subject to change without notice. Please call to confirm pricing, specifications and warranty details.

Contenda:™ or 486SL CPU!

486SL OR 386SL: IT COULD BE THE ONLY PC YOU'LL EVER NEED!

The 486SL gives you everything the 386SL version does, plus a few choice enhancements: 3.3 volt technology for added battery life, extra video RAM, PI local bus for Windows acceleration, and a high-speed floppy drive controller.

Take your pick. You'll find both Contendas give you the power and room for practically everything you'd use in a desktop system. You can easily run DOS, Windows and Windows applications. *And you can get all three*—including the new Lotus Organizer—the personal information manager that's so easy to use, it could make your DayTimer obsolete. Check out our upgrade packages for details. Then give us a call!



YOU GET CUSTOMER SUPPORT THAT'S THE BEST IN THE BUSINESS.

Our relationship with you doesn't end once we ship your Contenda. ZEOS pioneered comprehensive customer support, and it's what keeps our customers coming back again and again. We back all of our products with Toll-Free Technical Support, 24 hours a day, 365 days a year.

And we guarantee your satisfaction. If you're not absolutely convinced your new ZEOS Contenda is everything we say and more, you have a full 30 days to return it to us for a complete, no-questions-asked refund. Plus, you're covered by our One Year Limited Warranty and much more. You're going to be very satisfied. *We guarantee it!*

CALL NOW TOLL FREE
800-554-5220

Fax: 612-633-1325
Govt.: 800-245-2449
Hearing Impaired (TDD): 800-228-5389. Outside U.S. and Canada: 612-633-6131. MasterCard, VISA, AmEx, Discover, Z-Card,℠ COD and affordable leasing programs. Open 24 Hours A Day, 365 Days A Year!

ZEOS INTERNATIONAL, LTD.

486SL CONTENDA PACKAGE I:
$1795

- CPU: Intel 486SL operating at 3.3v
- Processor Speed: 25MHz
- Intel's PI local bus for video acceleration!
- Memory: 4MB operating at 3.3v
- Hard Drive: 80MB
- Display: VGA backlit, 640x480, .23mm dot pitch, Sharp 7.4" diagonal, up to 64 shades of gray
- 512K 3.3v video RAM
- Local bus video controller operating at 3.3v
- Battery: NiMH; operating time up to 5 hours with power management
- Size: 9.7" x 6.1"
- Weight: Only 3.9 lbs.
- Power Management: Fully featured, including Deturbo, Standby and Suspend to disk
- Keyboard: Comfortable 80-key with embedded numeric keypad
- I/O Ports: 1 serial and 1 parallel standard; ports for optional internal modem, external 3.5" floppy and external color VGA or SVGA monitor
- Pointing Device: Easy-to-use trackball
- Warranties and Guarantees: ZEOS award-winning 24-Hour Toll-Free Technical Support, 30-Day Absolute Satisfaction Guarantee, complete Customer Satisfaction Package

486SL CONTENDA PACKAGE II:
$1995

You get all of Pkg. I, plus external floppy, DOS, Windows and Lotus Organizer!

486SL CONTENDA PACKAGE III:
$2395

We upgrade Pkg. II to 8MB of RAM—and add a custom-fitted nylon carrying case, additional battery and fax/modem. Perfect for road warriors!

All products and company names are trademarks or registered trademarks of their respective holders. ©1993 ZEOS International, Ltd., 1301 Industrial Blvd., Minneapolis, MN 55413 USA. ZEOS is a publicly traded company. (NASDAQ symbol: ZEOS). SN2-PCW-9306.

Circle 260 on reader service card

PC WORLD

EDITOR IN CHIEF Philip Lemmons

EXECUTIVE EDITOR Russell Glitman
MANAGING EDITOR Cathryn Baskin
ART DIRECTOR Mitch Shostak

SENIOR EDITORS
Features Steve Fox
Reviews Owen Linderholm

EAST COAST EDITOR Randy Ross (617/422-8020)
SENIOR EDITOR, NEWS Joe Abernathy

EDITORIAL
Assistant Managing Editor Anne Kandra
Technical Editor Karl Koessel
Associate Editors Rex Farrance, Bronwyn Fryer, Roberta Furger, Bryan Hastings, Lincoln Spector
Assistant Editors Jeff Bertolucci, Michael Desmond, Anita Hamilton, Dan Miller, Melissa R. Riofrio, Christina Wood
Assistant Technical Editor Shane Rau
Assistant Editor, East Coast Laurianne McLaughlin
Editorial Assistant John Goddard
Editorial Intern Richard Melville
Fact Checker Caroline Jones

Copy Chief Richard Johnson
Senior Copy Editors Barbara Lewis, Marla Miyashiro, Peggy Nauts
Copy Editors Bonnie Jacobson, Kimberly Stein
Electronic Typographer Henry Pham

Assistant to the Editor in Chief Cynthia Grossman
Administrative Assistants Ken Blaylock, Amanda Lewis

Business Manager Scott Danish
Librarian Stella Chan

ART & DESIGN
Associate Art Directors Robert Kanes, Greg Silva
Senior Designers Barbara Adamson, Laura Guerin
Senior Design Associates Tim J Luddy, Carolyn Perot
Designer/Infographics Jeff Berlin
Assistant Designer/Infographics Hope Winslow
Production Artist Marlene Tobias

CONTRIBUTING EDITORS
Anita Amirrezvani, Steve Bass, TJ Byers, George Campbell, Scott Dunn, Thom Foulks, Brett Glass, Michael Goodwin, Judy Heim, Richard Jantz, Eric Knorr, Robert Luhn, Celeste Robinson, Richard Scoville, Ralph Soucie, Scott Spanbauer, Daniel Tynan, John Walkenbach

Founder David Bunnell
Founding Editor Andrew Fluegelman

PC WORLD ONLINE
Director/System Operator Jim Moody (PC World Online, PCW JimM; CompuServe, 71154,212)
Manager, Online Services Bundy Chanock (PC World Online, PCW BundyC; CompuServe, 71333,16)

PC WORLD TEST CENTER
Director Gregory Smith
Senior Performance Analysts Dean Andrews, Thomas Grubb
Performance Analysts Ulrike Diehlmann, Susan Silvius
Coordinator Dawn Furseth

USER GROUP ADVISORY BOARD
Steve Bass, Pasadena IBM Users Group; Roger Bender, Microcomputer Managers Association; Jack Bolton, Atlanta PC User's Group (APCUG); Brian Camenker, Boston Computer Society; Rollie Cole, APCUG; Paul Curtis, APCUG; Mary Dolce, Chicago Computer Society; Sandy Frunzi, Las Vegas PC User Group; Al Harrison, Houston Area League PC Users; David Hoffman, NYPC; Joseph Rigo, NYPC; Irving Samuels, Capital PC User Group

PRESIDENT Patrick Kenealy

PUBLISHER Richard J. Marino

PC WORLD LOTUS EDITION
Executive Editor Eric Bender
Senior Associate Editors Richard Cranford, Carrie Thomas
Associate Editors Cynthia G. Fitzgerald, Ann Kremers, Andrea C. Powers, Carol White
Assistant Editor Catherine Kenny

LOTUS EDITION MAILING ADDRESS
77 Franklin St. #300, Boston, MA 02110
Phone: 617/482-8470 **Fax:** 617/426-0235

LOTUS ALLIANCE PRODUCTS DIVISION
Vice President Jean Criss
Marketing Director Elizabeth Tucker
Art Director Melissa Holmes
Account Executive Wayne Silverman
Project Coordinator Carla Blakely

LOTUS NEWSLETTER DIVISION
Editor in Chief Jennifer J. Smith
Production Manager Andrew Ochrymowych

MULTIMEDIA WORLD SPECIAL SECTION
Publisher Jonathan Epstein
Editor in Chief Craig LaGrow
Art Director Adrian Morgan
Senior Editor, News and Reviews Paul Worthington
Copy Editor Cynthia Klein
Western Advertising Sales Manager A. G. Germano (415/978-3221)
Eastern Advertising Sales Manager Isabelle Kane (617/361-4246)
Sales Assistant Janett Kennedy (415/978-3208)
Office Manager Paul Fitzgibbon

MULTIMEDIA SECTION MAILING ADDRESS
501 Second St., San Francisco, CA 94107
Phone: 415/281-8650 **Fax:** 415/281-3915
America Online: MPC World
CompuServe: 75300,2503
MCI Mail: MPC **Prodigy:** KAMD36B

HOW TO CONTACT PC WORLD

MAIL
PC World Editorial, 501 Second St. #600, San Francisco, CA 94107
Phone: 415/243-0500 **Fax:** 415/442-1891
PC World Online: see instructions below
CompuServe: 74055,412
MCI Mail: PC World Editorial or 179-3813
Internet: 1793813@mcimail.com

LETTERS TO THE EDITOR
Address editorial correspondence to *Letters to the Editor.* Be sure to include your name, city, and state. We reserve the right to edit all letters.

HELP WITH YOUR PC HARDWARE AND SOFTWARE
Send questions about PC products and procedures to *Help Line.* Send consumer-related questions and complaints to Roberta Furger, *Consumer Watch.*

READER SUBMISSIONS
Send us your technical solutions. We pay $25 for each *Power Tip* we publish, $200 to the user group featured in *User Group Tips*, $25 to $200 for *Star-Dot-Star* items, and $50 for questions used in the *Here's How* section. Keep submissions brief (*Power Tips* to 100 words or less); accepted submissions will be acknowledged by payment.

NEW PRODUCT ANNOUNCEMENTS
Address hardware and software press releases to *New Products* or call 415/978-3212.

SUBSCRIPTION SERVICES, ADDRESS CHANGES
For *PC World, PC World Lotus Edition*, and the *Multimedia World* Special Section: Call toll-free 800/234-3498 (303/447-9330 in Colorado and Canada), or write Subscriber Services, P.O. Box 55029, Boulder, CO 80322-5029. To place new orders, call 800/825-7595.

REPRINTS AND PERMISSIONS
You must have permission before reproducing any material from *PC World, PC World Lotus Edition*, and the *Multimedia World* Special Section. To quote from or reprint any portion of any article or use artwork or photographs from the magazine, send a written request to *PC World*, Reprints and Permissions, 501 Second St. #600, San Francisco, CA 94107; include a phone number for a fast response. To order reprints of your company's editorial coverage in *PC World* or *PC World Lotus Edition*, call 415/978-3162. To order reprints of your company's editorial coverage in the *Multimedia World* Special Section, send a written request including your address and phone number to Paul Fitzgibbon, *Multimedia World* Special Section, 501 Second St., San Francisco, CA 94107, or call 415/267-1755.

PC WORLD ONLINE

You can contact the editors by sending electronic mail to the PC World Online area of America Online. The area features electronic access to the latest issue of *PC World* and *PC World Lotus Edition*, a database of back issues, new product announcements, a library of software utilities and index files, and message boards and conferences. To obtain a free America Online starter kit, call 800/827-6364, ext. 6138.

"It's really fast and the service is impeccable..."

PC WORLD May 1993

Introducing the ALR

EVOLUTION IV

FLYER SC 3/33

- Intel 33-MHz 386SX™ CPU
- Upgradeable to i486SXDX
- 2-MB RAM (expandable to 16-MB)
- 60-MB Hard Drive (other drives available)
- Integrated SVGA
- MS-DOS 6.0

Optional SVGA monitor (1024 x 768 .28mm) $299 #11001026

$699

FLYER SD 4/25s

Optional SVGA monitor (1024 x 768 .28mm) $299 #11001026

$899

- Intel 25-MHz i486SX CPU
- Upgradeable to i486DX2
- 2-MB RAM (expandable to 16-MB)
- 80-MB Hard Drive (other drives available)
- Integrated SVGA
- MS-DOS 6.0
- Windows 3.1 • ALR Mouse

FLYER SD 3 4/33

- Intel 33-MHz i486DX CPU
- Upgradeable to i486DX2
- 4-MB RAM (expandable to 36-MB)
- 32-Bit Memory Data Path
- 170-MB Hard Drive (other drives available)
- Integrated SVGA
- Super VGA Monitor

INCLUDES SVGA MONITOR

$1699

FLYER 32LCT 4/33

INCLUDES SVGA MONITOR

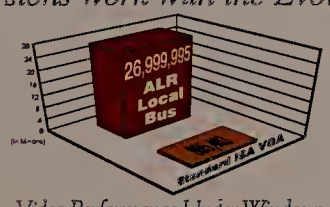
$2495

- Intel 33-MHz i486DX CPU
- Upgradeable to i486DX2
- 8-MB RAM (exp. to 32-MB)
- 256-KB Cache
- 240-MB HD
- Integrated SVGA
- Super VGA Monitor
- 12 Drive Bays
- 10 ISA Expansion Slots

VESA VL LOCAL BUS SYSTEM 4/33s

With its VESA VL local bus, powerful i486 processing, and finely tuned 32-bit architecture, this remarkable system sets a new standard for desktop performance and compatibility. Two VESA VL extensions work with the Evolution IV's six ISA (or available EISA) slots to provide twice the data path and three to four times the speed of the ISA bus alone. VESA compliance guarantees compatibility with a variety of third party local bus enhancements (video adapters, disk controllers, etc.), while adaptability to future applications is enhanced by a single chip upgrade path to Pentium processing. A third local bus slot, ALR's CL extension, accommodates the innovative ALR TriCombo™ board. This unique option combines local bus cache and video with high performance Ethernet networking capabilities.

intel inside



Video Performance Under Windows i486DX2/66 CPU, Winmarks V.2.5, High Score Wins

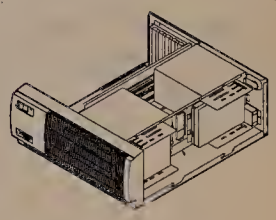
33-MHz i486SX™ CPU
i486DX™ UPGRADEABLE
Plus 66-MHz i486DX2™ & PENTIUM™ Technology

4-MB RAM (Upgradeable to 52-MB)

170-MB IDE Hard Drive

SVGA Monitor

2 VESA VL & 1 CL LOCAL BUS SLOTS,



6 ISA SLOTS
6 DRIVE BAYS

MS-DOS® 6.0, MS-Windows™ 3.1
ALR Two-button Mouse

$1545

Fastest... Most Powerful... Best Value... Winner... *it seems like editors are always saying the same things about our PCs. But who can blame them for being repetitive, especially when you look at the new generation of ALR systems.*

And it's not just our systems that have won industry praise. We've created a service and support program that PC World described as being "among the best." Our unique five year/fifteen month limited factory warranty delivers an unheard of five years of security. We even cover systems purchased through ALR's PrimeLine Direct with a 30-day money back guarantee, so you know you can buy with complete confidence!

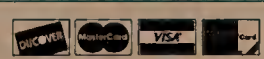
5 YEAR 15 MONTH warranty

30 DAY MONEY BACK GUARANTEE

ALR®
Advanced Logic Research, Inc.
9401 Jeronimo Irvine, CA 92718
(714) 581-6770 FAX: (714) 581-9240

800•444•4ALR

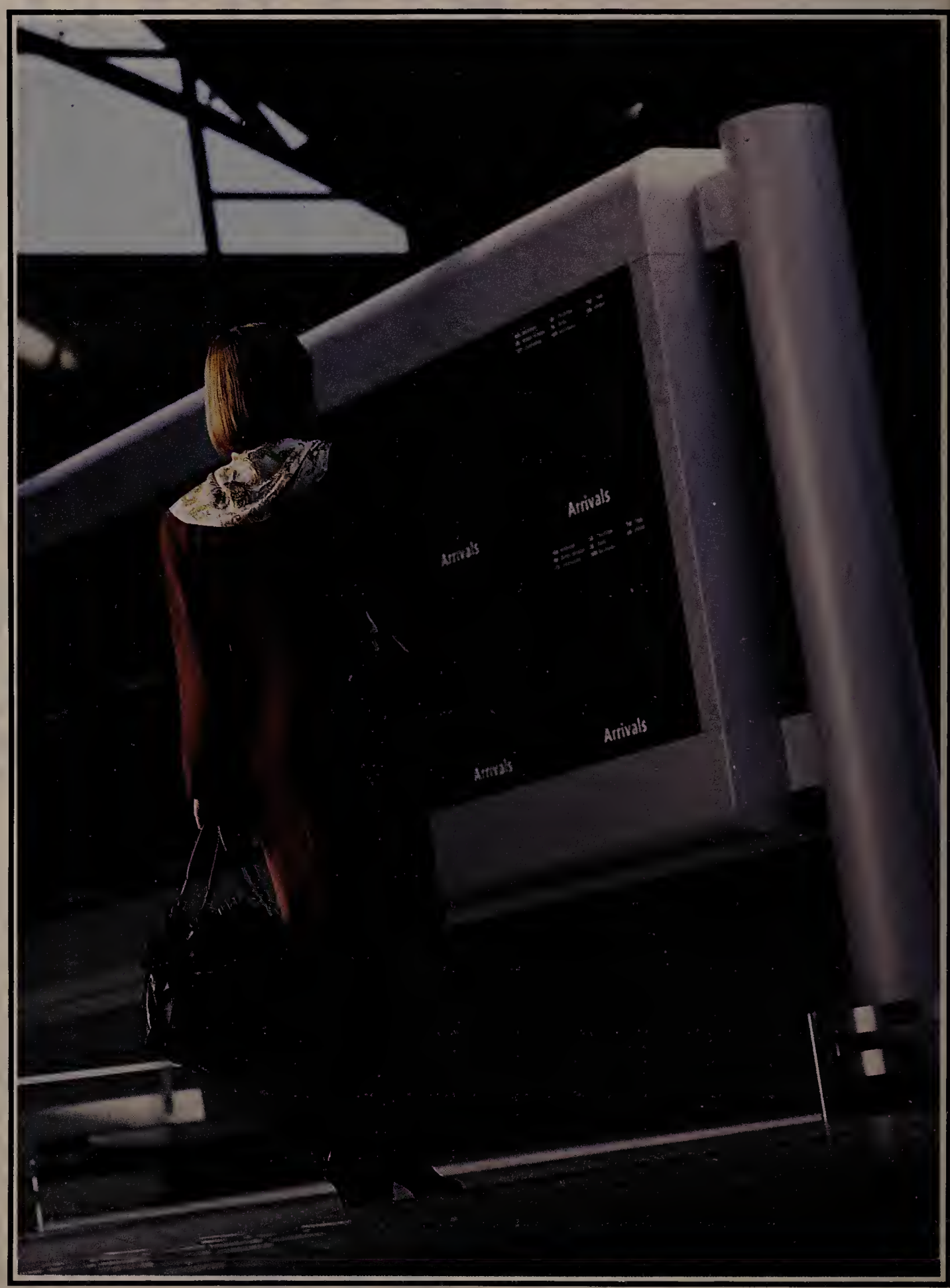
M-F 7AM-5PM SAT. 7AM-1PM PST



* Optional One Year On-Site Service for as little as $9.95 applies to selected models only. Verify exact options with ALR. Prices and configurations are subject to change without notice. Verify competitive pricing with manufacturer. Prices based on U.S. dollars. ALR is a registered trademark of Advanced Logic Research, Inc. Intel Inside logo is a trademark of Intel, Corp. All other brand and product names are trademarks or registered trademarks of their respective owners. ©1993 by Advanced Logic Research, Inc.

Circle 9 on reader service card

WHY NOTEBOOK DESIGN IS AND AIRPORTS AS IT IS ABOUT



© 1993 Compaq Computer Corporation. All Rights Reserved. COMPAQ Registered U.S. Patent and Trademark Office. CompaqCare is a trademark of Compaq Computer Corporation. Product names mentioned herein may be trademarks and/or registered trademarks of their respective companies. Photo courtesy of Pittsburgh International Airport.

As Much About Hotels Modems And Motherboards.

There are two ways to design a notebook PC: around a computer chip, or around a human being. And if you've used a Compaq, you undoubtedly know which of these approaches best describes our philosophy.

Now, of course, we at Compaq embrace innovative technology as much as anybody. We just don't think it serves much purpose without a thorough understanding of how people use it.

Which is why we look at airplane seats and hotel rooms as closely as circuit boards and serial ports. It is precisely this approach that enables us to build some of the most durable, reliable and useful notebooks on earth.

Notebook PCs with uniquely sophisticated power conservation tools so you get longer use out of the battery. Full-sized keyboards with familiar "hotkey" commands. And easy-to-read screens that rival the display quality of desktop systems.

Of course, even highly sophisticated features are worthless if they can't endure the punishment of daily use.

Which is why we subject our notebook PCs to testing that others simply couldn't withstand.

We drop them. We bake them. We freeze them. We even test new COMPAQ designs by opening and closing them ten thousand times to simulate years of normal use.

In short, we engineer our award-winning notebooks for the real world. A place that's filled with deadlines and flight cancellations and overhead storage compartments.

A place that can teach you as much about how to design notebooks as any computer lab on earth.

A help line that withstands the test of time. You can call our free 24-hour hotline seven days a week for as long as you own your computer.

Like the armadillo, Compaq notebooks feature built-in protection against the elements. In fact, our ruggedly engineered notebooks are among the most durable on earth.

COMPAQ

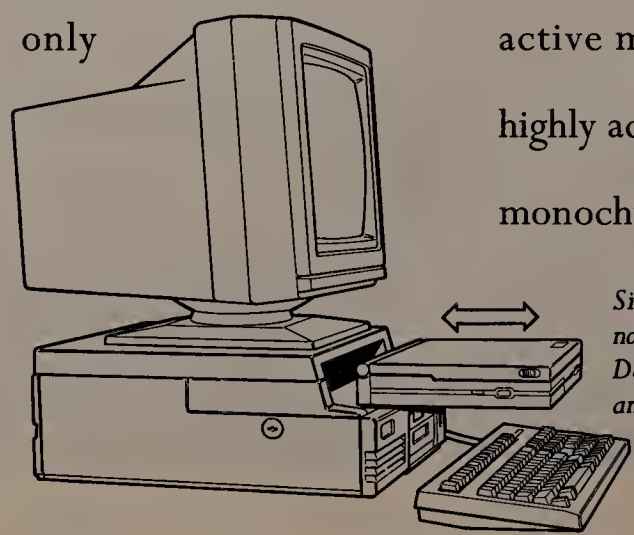
Circle 83 on reader service card

THE COMPAQ LTE LITE. FOR THEIR TIME WORKING. AND

OK, we're not saying you live on three hours of sleep, or that you eat Chinese takeout every night. And even if you do, we're not saying that a COMPAQ LTE Lite 486SL notebook is suddenly going to change all that.

What we will say is that it could make your life a lot simpler. Particularly if you travel.

You see, on one hand, these new computers are lightweight, compact notebooks (6.3 pounds, 8.5" x 11"). They're available with three different screens: the COMPAQ UltraView – the world's only black and white, active matrix VGA; a 256-color active matrix; and the highly acclaimed passive monochrome MaxLight.



Simply slide the LTE Lite notebook into the COMPAQ Desktop Expansion Base and you have a full-function, fully connected desktop computer.

There's the integrated EasyPoint trackball. And each has a range of innovative power-conservation features to help extend battery life.

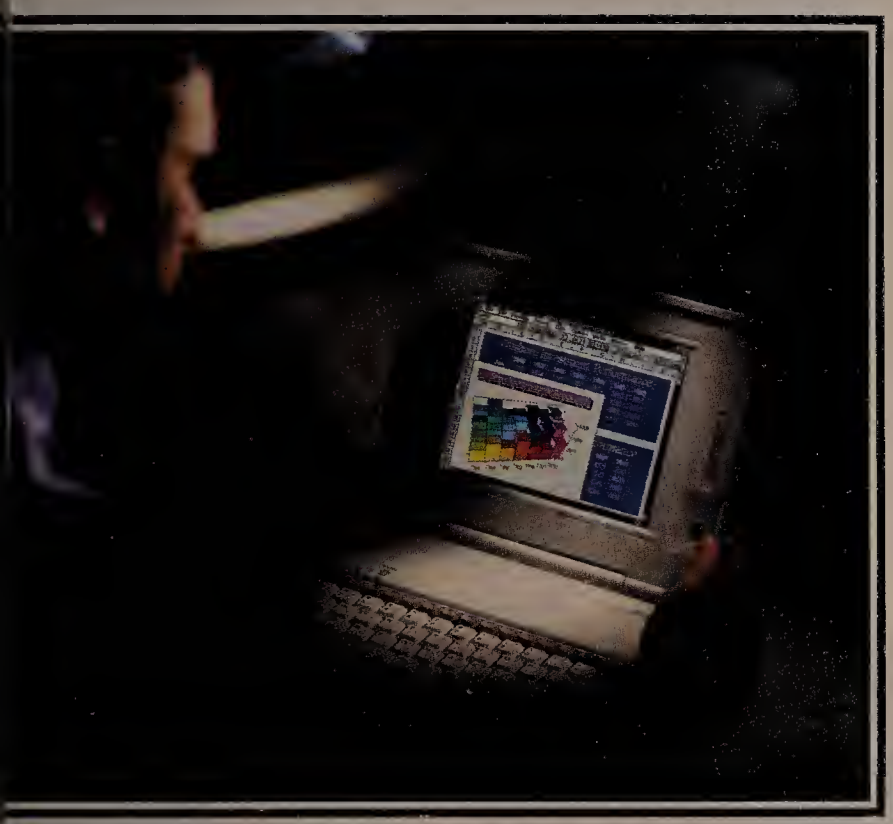
But what also makes these notebooks unique is

© 1993 Compaq Computer Corporation. All Rights Reserved. COMPAQ and LTE Registered U.S. Patent and Trademark Office. UltraView, MaxLight, EasyPoint, Enhanced QuickConnect, CompaqCare and SpeedPAQ are trademarks of Compaq Computer Corporation. Product names mentioned herein may be trademarks and/or registered trademarks of their respective companies. The Intel Inside Logo is a registered trademark of the Intel Corporation.

PEOPLE WHO SPEND HALF THE OTHER HALF WORKING.

that they double as full-sized, full-featured 486 desktop PCs.

By simply sliding your LTE Lite notebook into

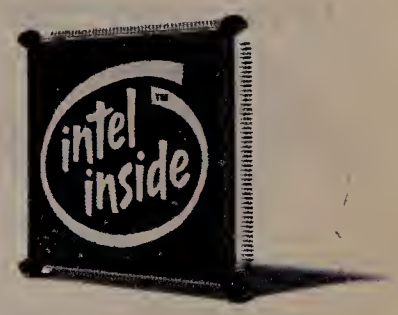


the COMPAQ Desktop Expansion Base, you're instantly connected to printers, peripherals and your network. No floppies, no fumbling with wires, no headaches. And the extra slots and drive bays increase expansion capabilities. Best of all, you're using the same hard drive. So whether you're in the office or on the road, your files are always with you. The expansion base also offers you a keylock to secure your notebook.

Of course, if you don't need all the functions of a full-sized PC, but want easy connection to your peripherals, choose the new Enhanced QuickConnect – a one-step system with integrated Ethernet and SCSI support.

And like all of our PCs, these notebooks are backed by CompaqCare. Which includes a free, three-year worldwide warranty, and a year of free on-site* service in the U.S. or Canada.

For more information about the COMPAQ LTE Lite 486SL notebooks, call 1-800-345-1518. Because if you work out of the office on a regular basis, you really lead two lives. So they're perfect for you. And you.



Unlike other 486 chips, the Intel 486SL, with an integrated numeric coprocessor, provides higher performance and extended battery life.

No wires, no interface boxes, no headaches. The optional fully integrated COMPAQ SpeedPAQ 144 Modem connects the LTE Lite directly to a cellular phone so you can send e-mail and faxes.

COMPAQ

*This service is provided by Contracted Service Providers and may not be available in certain geographic locations. Certain restrictions and exclusions apply. Monitors, battery packs and certain options are covered by a one-year warranty. For further details on our limited warranty, contact the Compaq Customer Support Center.

Circle 83 on reader service card

COMPAQ CONTURA. THE AFFOR
LEAVE YOU WISHING YOU

Buying some low-priced 486 notebooks is like buying a bottom of the line car. You drive off without power steering or air conditioning or even floormats. If you get away with an AM radio, you've pulled off a coup.

At Compaq, however, we believe an affordable notebook shouldn't merely be the stripped-down, bare-bones version of a more expensive one.

Take the new 486SL Contura notebooks.

Although affordably priced, they're COMPAQ computers in the truest sense. They endure the same torturous testing as every other computer that we build.

Inside there's an Intel 486SL chip. Unlike the 486SX chip in comparably priced notebooks, this one has an integrated coprocessor. And it runs more efficiently, helping to extend battery life.

4/25CX: *Active color VGA ◈ Integrated EasyPoint trackball ◈ NiMH battery ◈* **4/25c:** *Advanced passive color VGA ◈ COMPAQ Trackball ◈ NiMH battery ◈* **4/25:** *Monochrome VGA ◈ COMPAQ Trackball ◈ Enhanced NiCd battery*
All models: *Intel 25MHz 486SL with 8K cache and numeric coprocessor ◈ 4MB RAM (up to 20MB) ◈ 120MB or 209MB hard drive ◈ Preinstalled Microsoft Windows 3.1 and MS-DOS 5.0 as published by Compaq*
4/25 starts under $1,999†

You have your choice of three Contura screens, all of which offer razor-sharp definition. There's an active matrix screen that displays information in 256 colors. There's an advanced passive matrix color screen that offers 50% better contrast, and 33% improved response time over earlier passive technology. And there's a crisp and clear monochrome version as well.

The COMPAQ Contura 4/25CX comes with an EasyPoint trackball that eliminates the need for a mouse. And all of the Contura models offer a unique feature called

© 1993 Compaq Computer Corporation. All Rights Reserved. COMPAQ Registered U.S. Patent and Trademark Office. Contura and EasyPoint are trademarks of Compaq Computer Corporation. Product names mentioned herein may be trademarks and/or registered trademarks of their respective companies. The Intel Inside logo is a trademark of the Intel Corporation. *PC LapTop Computers Magazine*, January 1993. †Estimated U.S. reseller selling price. Reseller pricing will vary.

DABLE NOTEBOOK THAT WON'T COULD AFFORD MORE.

Hibernation. This allows you to shut your PC off quickly without losing any data, and marks the spot where you left off. When you start your PC up again, it automatically brings you right back to where you were.

Contura notebook PCs also come with an external battery charger that lets you recharge batteries in as little as an hour. And a variety of modem options, including cellular, allow you to send and receive data and faxes anywhere.

All of which explains why the editors at *PC LapTop Computers Magazine* recently named our Contura the best value in notebook computers.

If you'd like to know more, give us a call at 1-800-345-1518, and ask us about Contura. The notebook PC designed to accommodate your budget limitations, not constantly remind you of them.

*Thanks to our advanced graphics accelerator, Contura blows the doors off most other Windows notebooks. In fact, it runs Windows 30% faster than most 486 machines.**

*Nothing is backed like a Compaq because nothing is built like a Compaq. Contura includes a free three-year, worldwide warranty with a year of on-site** service in the US or Canada.*

COMPAQ

*In tests run by Compaq using *PC Magazine* Labs WinBench Release 3.1. **This service is provided by Contracted Service Providers and may not be available in certain geographic locations. Certain restrictions and exclusions apply. Monitors, battery packs and certain options are covered by a one-year warranty. For further details on our limited warranty, contact the Compaq Customer Support Center.

Circle 83 on reader service card

Now Windows is as easy to use as DOS.

Microsoft® Windows® is capable of great and wonderful things.

But if you're among the many who've traded the frustration of the C: prompt for the graphical confusion of Program Manager, relax.

You're about to discover what half a million delighted DOS® and network users already know.

That the shortest distance between you and your programs is straight through Direct Access.™

It's the world's best-selling menuing software. And as soon as you install it you'll understand why.

Direct Access searches your disk, gathers your programs into logical groups and builds menu screens just like the one you see at the top of this page.

All by itself.

That's right. You just load it and forget it.

Whenever you want an application, all you have to do is hit one key.

Or, if you prefer, click one mouse.

The more applications you have on your disk, the more you'll delight in Direct Access.

That's because Program Manager insists on grouping your programs into five arbitrary categories: "Windows Applications," "Non-Windows Applications," "Accessories," "Games" and "Main."

Not very intuitive, eh?

Direct Access, on the other hand, gives you a multitude of utterly sensible program groupings – 17 of them.

And that doesn't count the customized ones you dream up yourself.

What does all this mean to you?

It means you can get to a spreadsheet by simply clicking "Spreadsheet." Sum-

Direct Access searches your hard disk, groups your applications logically and generates menus and submenus automatically. All you have to do is point and click.

mon a word processor by stroking "W." And access a DBMS by selecting, you guessed it, "Database."

You can even park your favorite programs right on the main menu and ask for them by name.

Hey, we didn't call it Direct Access for nothing.

If the only PC you're responsible for is the one on your desk, Direct Access is valuable, indeed.

But if you're responsible for a department full of PCs, Direct Access is priceless.

Suddenly all of your Windows and DOS users can follow the same quick, convenient route to their applications.

And if all those PCs are networked, so much the better. Because you can install – and customize – Direct Access on everybody's workstation without leaving yours.

You can decide for yourself precisely who gets access to which menu items.

And prevent novice users from even *looking* at DOS.

There's more. A lot more. So pick up the phone. Dial 1-800-388-0362.

We'll tell you about our one-year money-back guarantee and our vaunted toll-free customer support.

Which you can access directly, 24 hours a day.

FIFTH GENERATION SYSTEMS, INC

Circle 235 on reader service card

Choices on the Desktop

With the announcement of Windows NT, Microsoft has given you a wider choice of desktop systems than ever. Along with Intel's 486 family and its formidable new Pentium chips, Digital Equipment's Alpha PC and Acer's MIPS R4000 PCs are platforms for NT. Cyrix and AMD are also hastening to market with high-end 486-compatible processors. The power of such chips to run PC software, like Pentium's, will encompass the world of Windows NT and extend to DOS applications and utilities as well.

Two things must happen to make moving to NT on Alpha or MIPS PCs worthwhile. First, all the major *Windows* applications must be made available for these systems. Second, the Alpha and the MIPS must show a decisive edge in performance over Intel-compatible PCs—decisive enough to entice people to give up backward compatibility with the host of utilities and applications for DOS and *Windows 3.1*.

We are working around the clock to assess the new NT processors, trying as always to measure real-world performance by testing with software that you buy and use.

Windows Versus Windows

Though Microsoft is the catalyst for bringing the *Windows* world a broader choice of CPUs, who will give us an alternative to *Windows?* IBM and Apple are the most promising challengers. But their Taligent joint venture will come too late. They need to act now.

IBM could restart the game by dropping the obscure and never-popular name *OS/2* in favor of *IBM Windows*. The FTC has ruled the term *Windows* generic, noting its wide use before the announcement of *Microsoft Windows*. Some companies, notably Quarterdeck, have never accepted or acknowledged Microsoft's ownership of the term.

Such a move by IBM would not mislead the computing public—*IBM Windows* does run *Microsoft Windows* applications. The time is ripe for a contest of merit—plain old competition.

Apple's opportunity to ehallenge Microsoft is even greater, because the most significant weakness of *Microsoft Windows* remains its user interface. If Apple transplanted its Macintosh operating system to the PC, Apple could win perhaps one-third of the desktops in North America within a year. But Apple can't do that, some say, because it would hurt Macintosh sales.

To the contrary: Apple's risk is greater if it fails to put millions more copies of the Mac operating system on PC-compatible desktops. This scenario is the most likely way for Apple to keep developers writing Mac applications rather than ignoring the Mac and focusing exclusively on *Windows*. All the major Mac applications are moving to *Windows* anyway; witness *QuarkXPress* and *Photoshop*. This migration is sure to hurt Mac sales and Apple revenues. The best strategy for Apple is to propagate the Macintosh operating system and seize a share of the vast revenue in the PC software market. Apple can surely make PCs easier to use and yet continue to integrate its own hardware and user interface so well that the Mac will remain attractive.

A New 1-2-3 for Windows

Top of the News takes an in-depth look at the new *1-2-3 release 4.0 for Windows*. Richard Scoville and Randy Ross spent time with that product to determine whether Lotus has caught up with its archcompetitors in *Windows* spreadsheets, Microsoft and Borland. The news is good for spreadsheet wizards and businesspeople everywhere. This conclusion is affirmed by additional coverage of *1-2-3 release 4.0 for Windows* in our Lotus news pages, in which one admirer of the new release says, "On day one, new users can understand the product."

PC World
Editor in Chief
Phil Lemmons

As with spreadsheets, the database competition for *Windows* is fierce. Our review "Databases Come to Windows" covers outstanding products from vendors including Microsoft and Borland.

In other coverage this month, Scott Spanbauer sizes up Windows NT for 1993 and the future in his article "Windows NT: The New DOS?" And our Test Center and review staff look at 25 low-cost desktop 486s, some of which we expect to crash the $1000 barrier by the time you receive this issue.

Phil Lemmons

Phil Lemmons, Editor in Chief

KELLY FALLON
RESEARCH ANALYST
FIRST USED IMPROV 2/3/93

SURE, ANY SPREADSHEET CAN DO THE A,B,C'S. IMPROV HAS MASTERED ENGLISH.

IMPROV® FROM LOTUS® DOESN'T WORK THE WAY YOU EXPECT. INSTEAD, IT ACTUALLY WORKS THE WAY YOU THINK. IN PLAIN ENGLISH.

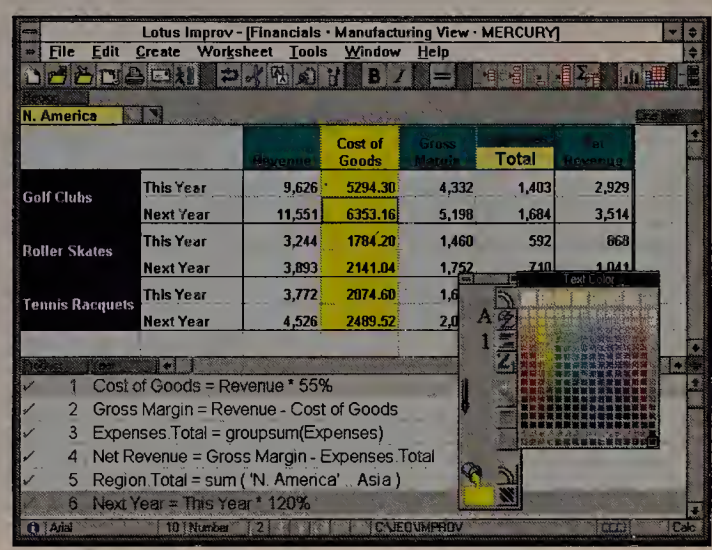
NO MORE TRANSLATING BUSINESS MODELS INTO CRYPTIC LITTLE FORMULAS. NO MORE CELL ADDRESSES LIKE "B23" AND "C10." BECAUSE THE IMPROV SPREADSHEET IS DIVIDED INTO CATEGORIES AND ITEMS LIKE "QUARTER 4" AND "REVENUE."

SO IF YOU WANT TO ENTER A FORMULA TO CALCULATE GROSS MARGIN YOU JUST TYPE IN "GROSS MARGIN=REVENUE–COST OF GOODS" OR POINT AND CLICK ON THOSE ITEMS AND CATEGORIES.

BUT THE ENGLISH LANGUAGE FORMULAS DO A LOT MORE THAN MAKE IMPROV MORE NATURAL TO WORK WITH. SINCE THEY'RE NOT CELL ADDRESS-BASED (B5+C6 – D5), THEY CAN EASILY BE APPLIED TO MANY CELLS AT ONCE. WHICH MAKES IT EASIER TO EXPAND YOUR MODEL AND HARDER TO MAKE ERRORS, WHEN MANIPULATING YOUR WORKSHEET.

AND WITH ALL LABELS AND FORMULAS EXPRESSED IN ENGLISH, THE SPREADSHEET IS TOTALLY SELF-DOCUMENTING. SO ANYONE CAN TURN TO IT AT ANY TIME AND UNDERSTAND THE LOGIC BEHIND IT.

ALL OF WHICH STILL CAN'T UPSTAGE THE NEWS THAT IMPROV IS THE WORLD'S FIRST DYNAMIC SPREADSHEET. AND THAT WILL LITERALLY CHANGE THE WAY YOU LOOK AT SPREADSHEETS.



LOOK, EVERYTHING IS IN ENGLISH. YOU'VE JUST SEEN IT AND ALREADY YOU CAN UNDERSTAND THIS SPREADSHEET

WITH ITS DYNAMIC VIEWS, IMPROV LETS YOU ROTATE, HIDE, SHOW, COLLAPSE, SLICE, DICE AND EXPAND WORKSHEETS IN WAYS NO TRADITIONAL SPREADSHEET CAN. SO RATHER THAN SPENDING HOURS RECONSTRUCTING WORKSHEETS TO GAIN NEW PERSPECTIVES, YOU JUST DRAG AND DROP A CATEGORY TILE WITH YOUR MOUSE. THE NEW VIEW IS CREATED ON THE SPOT.

WITH IMPROV, LOTUS TAKES THE WINDOWS™ PLATFORM BEYOND THE VISION OF ANY OTHER SOFTWARE DEVELOPER.

TO PUT IT IN PLAIN ENGLISH, INFOWORLD SAID "SERIOUS SPREADSHEET USERS...OWE IT TO THEMSELVES TO GET A COPY OF THIS $495 PACKAGE."[1] ESPECIALLY SINCE, FOR A VERY LIMITED TIME, IMPROV FOR WINDOWS IS ACTUALLY AVAILABLE AT AN INTRODUCTORY PRICE OF JUST $99.[2] HOWEVER, ON JUNE 1, 1993, THE PRICE DOES RETURN TO $495.[3]

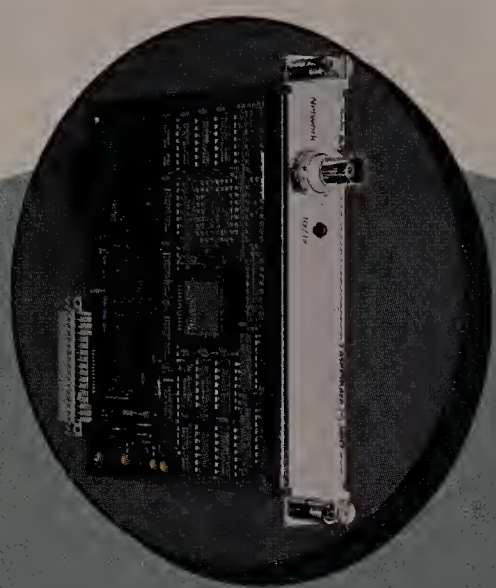
SPECIAL INTRODUCTORY OFFER. REGULAR PRICE $495.

TO ORDER, CALL US DIRECT AT **1-800-872-3387, EXT. 8772,** OR VISIT YOUR LOCAL LOTUS AUTHORIZED RESELLER.

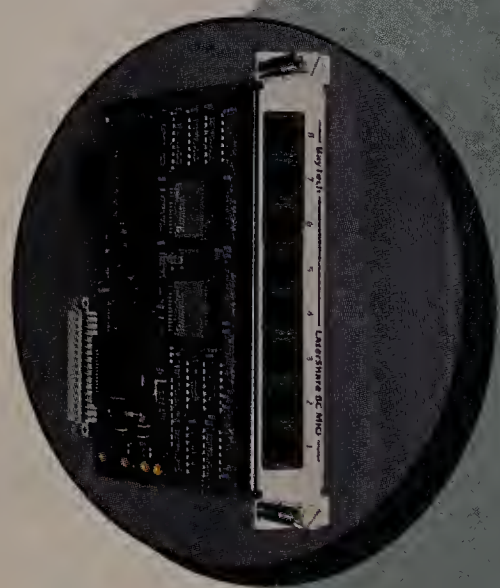
Lotus **Introducing Improv**

THE FIRST DYNAMIC SPREADSHEET FOR WINDOWS

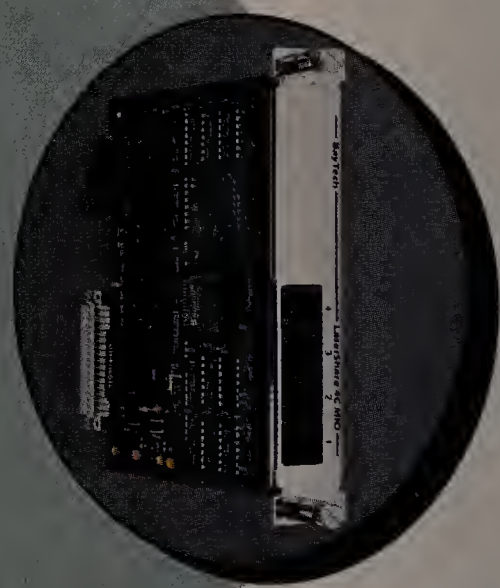
HP Connectivity
More Affordable, Faster Performance



Ethernet Netware®
Print Server $395.00



Printer Sharing 8 Serial Ports
$695.00



Printer Sharing 4 Serial Ports
$549.00

Printer Sharing 4 Parallel Ports
$549.00

$50.00 Rebate on LaserShare® MIO

Purchase a LaserShare before August 31, 1993 and receive a $50.00 rebate.

Network Print Servers For HP LaserJet MIO

BayTech has combined performance and affordability in the new Ethernet print server card. The LaserShare® PS-MIO easily installs into the MIO slot of your HP LaserJet Series 4, IIISi and 4Si laser printers.

The three key advantages LaserShare PS-MIO has over standard network printing are: speed, printer location, and congestion reduction. The fast through-put speeds allow downloading of large text and graphic files at the speed of your network. It increases file server efficiency by assuming the printing functions of the file server. You can locate your laser printer anywhere on the Novell Netware® 3.x compatible network by using either 10BASE2 or 10BASE-T connections.

For only $395.00 it is the best low cost, high performance print server available.

8 Can Share Your LaserJet

BayTech is pleased to offer a more diverse LaserShare product line with the inclusion of MIO expansion cards.

LaserShare allows up to 8 users to connect simultaneously to the MIO expansion slot of your HP LaserJet laser printer. LaserShare models are available with 4 parallel ports, and 4 or 8 serial ports. LaserShare's standard 1MB buffer is user expandable to 4MB. The LaserShare 4A-MIO is the only 4 parallel port card available for HP LaserJet MIO products.

Parallel input speeds of 70Kcps are the fastest in the industry. Use BayTech's Tran-x® for parallel printing, with serial port models, for distances more than 1,000 feet and speeds to 46Kcps.

Experience & Reliability

For 17 years, BayTech has been a leader in the design and manufacture of data communication products including: Network Print Servers, Printer Sharing Solutions, Statistical Multiplexers and Data Acquisition Controllers. Call toll-free today to learn more about BayTech connectivity products.

All product or company names are trademarks of their respective holders.

Because Resources Should Be Shared

BayTech®

Data Communications Products Division
200 N. 2nd St., PO Box 387, Bay St. Louis, MS 39520
Fax: 601-467-4551 Phone: 601-467-8231
or toll-free

800-523-2702

Circle 95 on reader service card

How New Is New Software, the Hard Drive Dispute, Art and Taxes

What Planet Are You From?

I was rather surprised by your claim in "Is Your New Software Secondhand?" [March] that retail stores have liberal return policies for software. In my experience, the opposite is true.

The question, "What other industry lets you take home a $500 item, use it for 30 days, then return it for a full refund if you're not satisfied?" is particularly ludicrous. Almost every industry I know of allows returns of big-ticket items. The article then compares software to movies, books, and music. Exactly what planet do you live on? I've never paid more than $25 for a cassette tape or CD, or over $30 for a movie, or over $100 for a book. How do such items compare to a $500 one?

The real problem is that in most instances buyers are not allowed to sample software before they purchase it. This restriction poses a severe problem for people who are forced to make software purchases based on reviews in magazines and little pictures on the back of the box.

Rick Vineyard, Springfield, Illinois

Editor's response: The sidebar "Many Happy Returns" compared return policies on various kinds of copyrighted materials. You're right—software is considerably more expensive than most books or CDs. Still, the rules governing software returns are more analogous to those for other (albeit less expensive) types of intellectual property than they are to big-ticket items, such as stereo or computer equipment, that are not governed by copyright laws.

Your call for the opportunity to test-drive software is well taken. Although some stores have demo PCs on which sales staff will install software you're considering purchasing, the practice is not yet commonplace. Such demo stations would go a long way toward helping people make more informed buying decisions—and thus cut back on software returns. —*Roberta Furger*

Sterilized Software

I was disgusted—although not surprised—by the information I read in "Is Your New Software Secondhand?" Stores shouldn't return disks to the shelf that have been in another machine. I'd like to ask software retailers a question: I prepare IV needles in a hospital. If I promised you that I sterilized a previously used needle, would you approve of my sticking you with it?

Kenneth E. Henson, Fort Campbell, Kentucky

Two out of Three Isn't Good

I read the article "Is Your New Software Secondhand?" with real interest. Your timing was perfect, because I just had the experience of buying previously opened software. I purchased a copy of *XTree Gold*, which does not come shrink-wrapped because—I believe—XTree Company is trying not to add to the massive amounts of plastic waste we generate. After I opened the package, I discovered that the disk envelope had already been torn open.

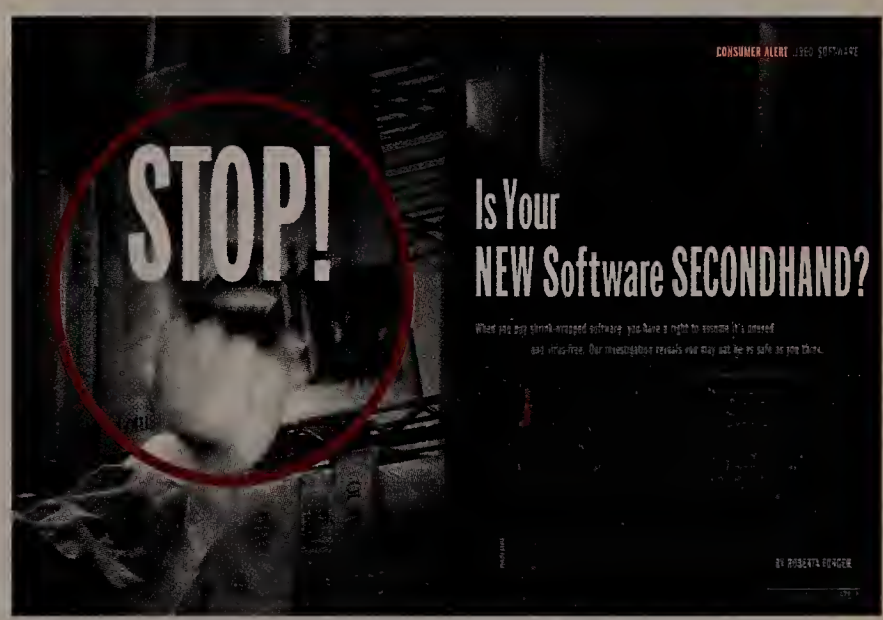
When I returned the package for an exchange, the store manager and I agreed that I should open the next package in the store. This package also had been tampered with. The third package that I opened was okay. Two out of three packages strikes me as an awfully high number from a store that claims all returned software is sent back to the vendor.

Dan Coppock, Novato, California

In the Back of the Store

The article "Is Your New Software Secondhand?" reminded me of a recent visit I made to a software retail store. My son needed to answer the call of nature, and a sales clerk directed us to the rear of the store. On a table we noticed a large stack of opened software. Next to it stood a shrink-wrap machine. Is it possible that the software wholesaler requires that all returned software be shrink-wrapped before it's shipped back to them?

Steve Firestone, Van Nuys, California



And Hardware, Too

Your secondhand-software article was interesting, but software isn't the only area that needs to be monitored.

Last year I bought a printer—shrink-wrapped. When I got it home, I found no instruction manual and no instruction disk. The printer was covered with greasy fingerprints, and one of the printer cartridges was open and mangled.

I took it back to the store and waited 30 minutes while someone verified the box's contents. The manager said he couldn't refund my money because "the manual and disk are missing, the printer is dirty, the carrying case is missing (I had overlooked that omission), and one print cartridge is damaged." When I pointed out that these were the very reasons I was returning the unit, he said, "Oh, it must have been returned." After I hassled with him for another 30 minutes, he finally gave me a refund.

Bob Moore, Lakewood, Colorado

Pundit Speaks Truth

It seems as if I have been reading *PC World* since the beginning of time. But Lincoln Spector's article "Tips to Organize Your Hard Disk" in the March issue is the first instance in my memory where any PC pundit has recommended what became obvious to me only after several attempts at organizing hard disks: Data files should be segregated from programs, either in their own branch of the directory tree or on their own disk or partition. I applaud Lincoln Spector for saying so in a public forum.
Rob Kirkland, via CompuServe

But Can He Count?

In his March article "Tips to Organize Your Hard Disk," Lincoln Spector notes that "You can't put DEC_SMITH.WK1 in both your C:\DATA\Q4 and your C:\DATA\SMITH directories." As a matter of fact, you can't put that file in any directory. Or has Lincoln Spector discovered a secret way that he can manage to cram nine letters into a standard DOS file name?
Howard L. Kusnetz, Houston, Texas

As Much Fun as Flat, Warm Soda

Lincoln Spector's article "Tips to Organize Your Hard Disk" was about as useful as a can of Pepsi left open overnight in the summer. To add to my misery, the sidebar "Lincoln's Favorite File Organization Tools" reads like some copywriter's dream rather than a "grizzled *PC World* veteran's" sincere efforts to educate. Words like *incredible*, *slick*, and *coolest* are better off elsewhere (guess where?).
Imran T. Ahmed, Fairfax, Virginia

Magellan Fan Club

I very much enjoyed reading "Tips to Organize Your Hard Disk." I was especially pleased to see that Lincoln Spector is a fan of *Magellan*. I too am a fan and have been touting this program since shortly after its release.

I called Lotus to find out if it will ever update *Magellan* to include *PKZip 2.x* support since all the BBS's seem to have upgraded their file compression. Their answer wasn't very encouraging. Maybe if we started a *Magellan* fan club, Lotus would be more likely to sit up and take notice.
Ronald B. Hirsch, Boca Raton Florida

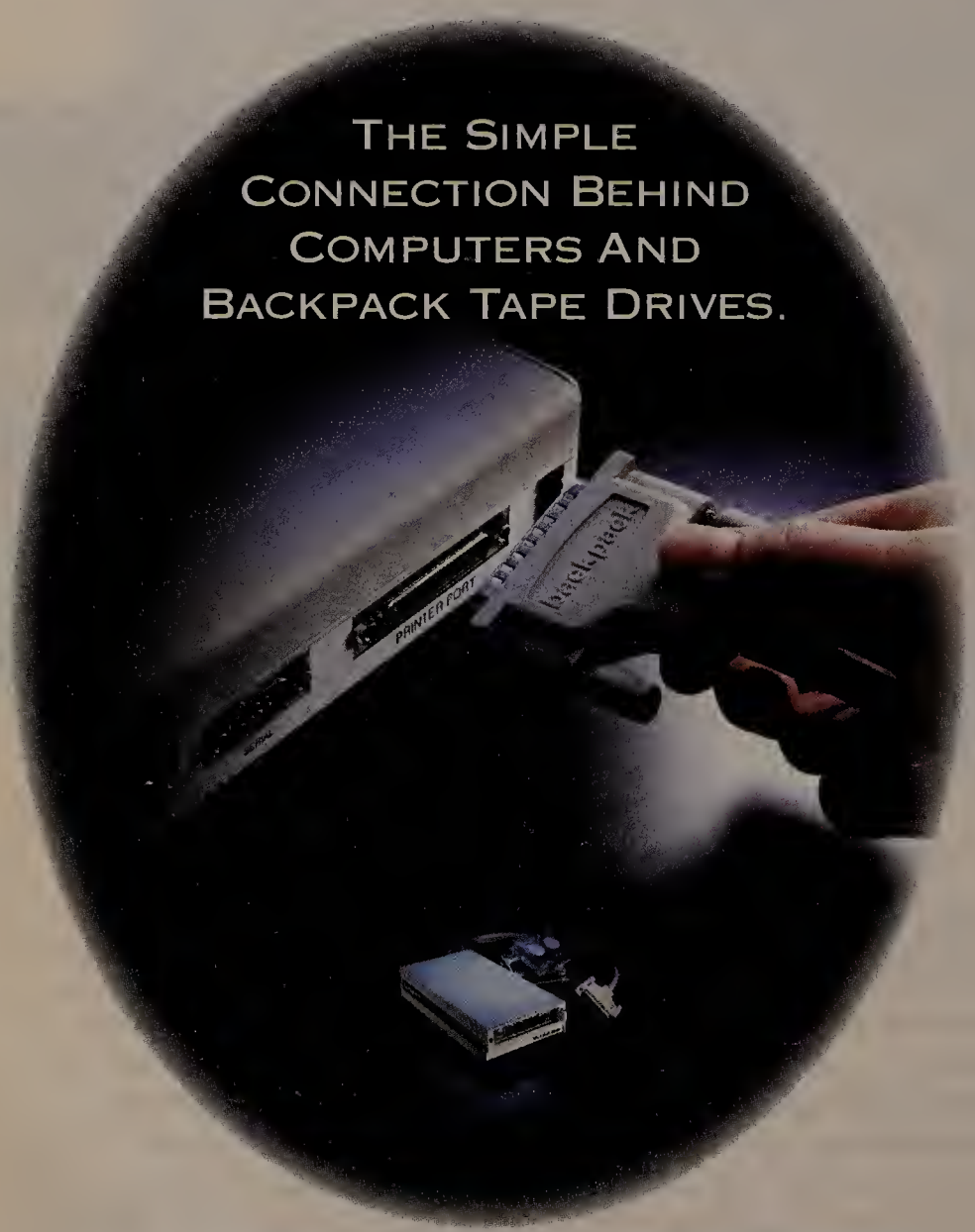
Editor's response: There is something of a *Magellan* fan club on CompuServe. Type **GO LOTUSB**. You'll find plenty of other users who would like to see the program updated, tricks about how to use it, and even some homemade file viewers.

While Lotus is not likely to add *PKZip 2.x* support to *Magellan*, several other file management programs with similar capabilities, such as *Outside In*, *Norton Desktop for DOS*, *PC Tools*, and *XTree*, probably will include support for it in their next updates.
—Lincoln Spector

Fashionably Late?

Having just read the article "Deep in the Art of Taxes" [March], I think you could do your readers a service by reporting on how early someone can file a return using various tax preparation software.

I have just concluded a second frustrating year of trying to go modern with my tax filing. Last year I waited till well past my



It's fast. It's small. It's reliable. It's incredibly compatible.

Backpack is the best selling parallel port tape drive on the market. We'd like to tell you why.

With Backpack, tape backup is quick and simple. Just plug it into your printer port and it's ready to use. No hardware conflicts, no slots required. One model fits all IBM PCs, compatibles and portables, regardless of CPU speed.

Backpack can store up to 250MB on a tape using data compression, is completely QIC80 compatible, and reads QIC40 tapes.

With its compact size and 1Mbps transfer rate, Backpack is the smallest and fastest parallel port tape drive you can buy.

Micro Solutions is dedicated to the perfection of backup technology.

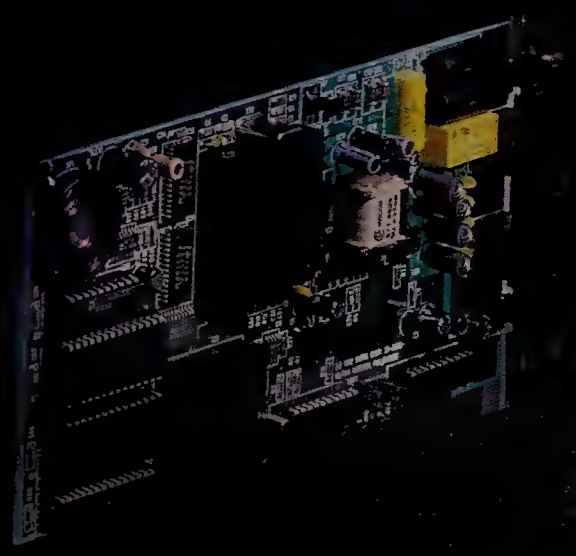
CD-ROM, hard drive, and diskette Backpack drives are also available. Call today for ordering information and a dealer nearest you.

Telephone 815.756.3411 FAX 815.756.2928

MicroSolutions
132 West Lincoln Highway DeKalb, IL 60115

See us at COMDEX, Booth # 2348

Circle 200 on reader service card



"Recommended."
Jerry Pournelle, Byte, July 1992

Inside Out

SupraFAXModem V.32bis Internal
$349.95 Dos/Windows

The Best Choice: SupraFAXModem

SupraFAXModem V.32bis External
$399.95 Stand Alone
$439.95 Dos/Windows

Inside or Out, now you can choose the hot-selling SupraFAXModem technology that best fits your computer. Either way, Supra can turn your PC into a communications powerhouse!

SupraFAXModems come in a wide range of models, from our budget-minded SupraFAXModem 24/96i to the fastest fax modem available: the SupraFAXModem V.32bis. Whichever model you choose, you will get Supra's proven technology and reputation for high-quality, reliable modems.

Supra modems are designed for novice and expert communicators alike. Whether you use DOS™, Windows™, or a Macintosh™, we've got a package for you — and our packages include everything you need. Plus our easy-to-follow Getting Started manuals will help you install your modem and start using it in just a few minutes! Imagine sending and receiving perfect faxes, exploring the world of on-line databases, or retrieving an important work file — all from the convenience of your desk. And advanced users will appreciate the error-correction and data-compression features that can save you money!

No matter what your needs, a Supra modem is your best choice. Call us today at **1-800-727-8667**, and find out why!

Supra Corporation

MODEL	INT./EXT.	FAX	DATA	V.42bis & MNP 5	MAX THROUGHPUT
SupraFAXModem V.32bis	E,I	14,400 S / R	14,400	yes	57,600
SupraFAXModem V.32	E	9600 S / R	9600	yes	38,400
SupraFAXModem Plus	E	9600 S / R	2400	yes	9600
SupraFAXModem 24/96i	I	9600 S / 4800R	2400	w/ software	9600

DOS Package includes modem, Fax Talk™ Plus, COMit™, cables, manuals • **Windows Package** includes modem, Winfax™, cables, manuals

Rockwell Modem Technology

CALLER ID AVAILABLE NOW

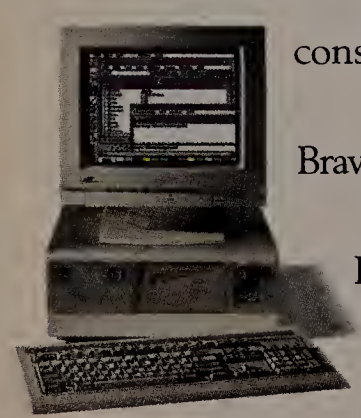
QUALITY GUARANTEE 5

All trademarks belong to their respective companies. 7101 Supra Drive S.W., Albany, OR 97321 USA • 503-967-2410 • Fax: 503-967-2401

Circle 249 on reader service card

EVEN as his model aircraft *screamed* into the oak, our AST designer remained PREOCCUPIED with *thoughts of PCs.*

Even in their free time, our engineers are obsessed with PCs. A condition that can turn an afternoon with a model plane into an adventure. But it's a small price to pay when you consider the results: the third-generation AST Bravo desktop PCs. With Bravo, our engineers addressed the issue of PC price/performance head-on. First, they enhanced Windows™ performance. Then, they improved reliability while reducing costs by creating an upgradable, four-layer systemboard that's half its previous size. It's just one more example of how AST has been setting PC standards for over 13 years. In fact, our latest Bravo series has already won the praise of *BYTE, PC World* and *InfoWorld.* While our flying has won the praise of, well...



AST® COMPUTER

The Product Of Our Obsession.

©1993 AST Research, Inc. All rights reserved. AST, AST logo are registered trademarks of AST Research, Inc. The Intel Inside log

BRAVO

POWER

Intel 486SX/25, 486SX/33, 486DX/33, 486DX2/50 or 486DX2/66 microprocessor. Optional 256KB second-level cache.

GRAPHICS

Video RAM upgradable to 1MB. Super VGA video controller supports 1024 x 768 color resolution.

FLEXIBLE

Four drive bays, four 16-bit ISA slots. Up to 64MB memory.

BUNDLED

120MB hard drive, 4MB RAM, 1MB Video RAM, high-res video monitor, mouse, pre-installed MS-DOS 5.0 and Windows 3.1.

RELIABLE

All models tested and compatible with the leading networking environments. All bundles are pre-configured and tested prior to shipping. Three-year warranty with standard one-year on-site service.

HONORS

BYTE *"1992 Award of Merit" (Bravo family).* PC World *"Best Buy" (4/66D).* InfoWorld *"Buyers Assurance Seal" (4/66D).*

RESPONSIVE

To learn more about our Bravo desktop PCs, just call 800-876-4AST.

AERODYNAMIC

A radio-controlled Gee Bee Super Sportster. With an 80cc gas-powered engine, it has a top speed of 160 mph. All optional, of course.

registered trademark of Intel Corporation. All other trademarks are the property of their respective owners.

usual filing time so that I could use the final version of *Parsons' Personal Tax Edge*. The company promised that the final version would not be as late this year.

I can't vouch for the timeliness of *Parsons'* final version this year. After trying the early release and finding that it did not transfer *Quicken* data automatically, I decided to try *TurboTax 93*. While I found *TurboTax* capable of direct automatic transfer of *Quicken* data, I again had to wait past my usual filing time for the final version to arrive. After waiting till February 14 for the state version, I finally gave up and did my returns by hand.

James D. Rapp, Eau Claire, Wisconsin

Deeply Disappointed

The anticipation with which I began reading "Deep in the Art of Taxes" soon turned to disappointment when I saw the statement, "Although you can't substitute your printouts for the official state forms, the software companies sell plastic overlays to produce a legal photocopied state return." This assertion is not true for the program I use—*Andrew Tobias' TaxCut*. This package does generate printouts that I can file. Nor, I am confident, is it true for the other best-seller, *TurboTax*. Simple errors of fact like this lessen my confidence not only in the review but also in your magazine.

Michael D. Gordon, via CompuServe

Editor's response: An editing error altered the quoted statement so that instead of referring to only one program, *TaxPerfect*, it implied that none of the programs have fileable printouts. All the programs but *TaxPerfect* supply some state forms that you can file, although the particular states covered vary from package to package.

Pick a Boot

At the close of "Pick a Boot, Any Boot" [*Home Office*, March], Steve Bass mentions that DOS 6.0 is rumored to support multiple boots. One thing Bass doesn't mention is that DR DOS 6.0 supports multiple boots, and you can select what you want to load on the fly. Not only that, but DR DOS 6.0 is not merely rumored to provide hard disk compression, it does provide hard disk compression. Best of all, DR DOS is here now. While many people await the release of MS-DOS 6.0, some of us are apathetic about Microsoft's newest DOS. But we're eager to see what DR DOS 7.0 will provide.

John Elftmann, Omaha

Corrections and Clarifications

In the sidebar "Shareware on Line" in the April article "Great Software Under $50," we published the wrong phone number for America Online. The correct number is 800/827-6364.

In "Dot Matrix Lives!" in March, the table on pages 178 and 179 should have said that Star Micronics printers can print labels.

Mail your reactions, responses, and ideas to Letters, PC World, *501 Second St. #600, San Francisco, CA 94107; or send them electronically to the Letters forum on PC World Online; CompuServe, 74055,412; MCI Mail, PC World Editorial; or 415/442-1891 (fax). Include your name, city, state, and phone number. We reserve the right to edit letters.*

The Critics' Choice For Best Picture.

Again. And Again. And Again.

LUMINATOR™ JANUARY, 1993 | MEDIA PRO™ JANUARY, 1993 | LUMINATOR™ MEDIA PRO™ DEC., 1992

For convincing presentations, powerful instruction, and productive meetings, choose an award-winning LCD projection display from nVIEW. From gray scale computer projection to brilliantly colorful computer animation or full-motion video. From nearly any computer or video source.

Performance. Innovation. Service. Cast your own vote. See how an nVIEW projection display can improve your work — *and your image.*

Call **1-800-736-8439** or 804-873-1354.

nVIEW products are manufactured under U.S. Patent #4,763,993; #4,976,536; #5,153,621; and #5,150,238. Other and foreign patents pending. nVIEW, Luminator, and MediaPro are trademarks of nVIEW Corporation.

nVIEW
VISIONARY DISPLAY TECHNOLOGIES

Circle 176 on reader service card

NEW! EXTENDED DOS VERSION ALSO AVAILABLE CALL (800) 543-5837

Real Stats. Real Easy.

SPSS for Windows gives you answers your spreadsheet or database can't. It's a great value at $695!

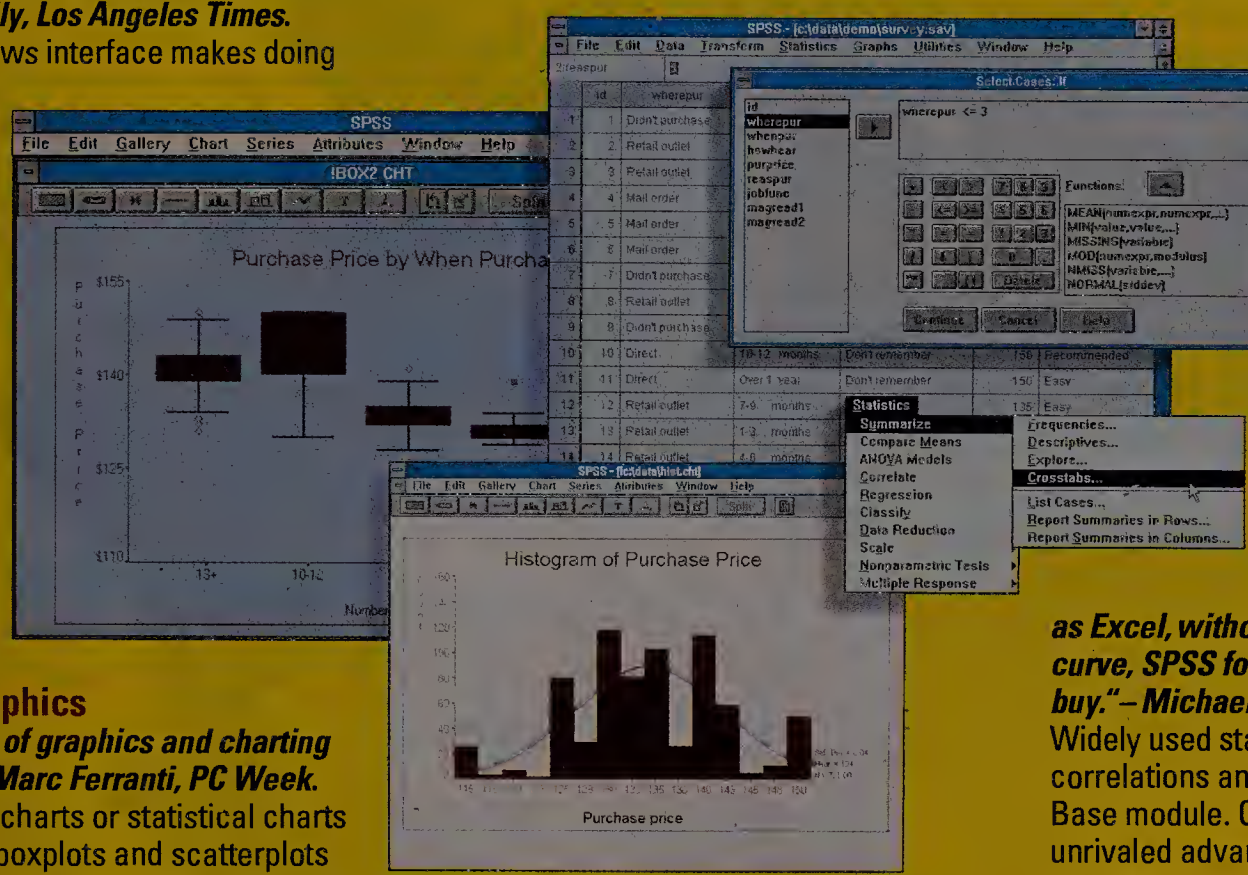
Learn Fast, Work Fast

"Stumbling blocks to statistical analysis are eliminated with SPSS for Windows. You don't have to be a programmer to use it and you don't have to be a statistician to understand it." – Richard O'Reilly, Los Angeles Times.

The 100% Windows interface makes doing analysis simple. Context-sensitive help and an on-line glossary of statistical terms are just a click away.

Complete Data Management and Editing

"A breakthrough in data capacity and ease of use...impressive." – Alan Fridlund, InfoWorld. There's no limit on the number of variables you can analyze. Read data directly from Excel,™ Lotus,® .dbf and SAS® transport files. Work live with Oracle® and SQL Server™ data. Edit and use data many ways, easily.



Automatic Statistical Graphics

"A complete set of graphics and charting capabilities." – Marc Ferranti, PC Week. Create business charts or statistical charts like histograms, boxplots and scatterplots automatically. Unlike other stats packages, edit the charts directly on-screen without respecifying.

In-depth Statistics

"For more statistical analysis tools than you'll get from a spreadsheet such as Excel, without the steep learning curve, SPSS for Windows is a great buy." – Michael Burgard, PC/Computing. Widely used statistics such as crosstabs, correlations and regression are in the Base module. Optional modules with unrivaled advanced statistics are available. You won't grow out of this package.

When you really want answers you have to go beyond what spreadsheets or databases can offer. You need a package that is designed for real statistical analysis, reporting and charting – and is easy to use. You need SPSS® for Windows,™ the real stats, real easy combination that delivers real value.

You'll break out of the spreadsheet cell with SPSS for Windows. Do more than simple percentages and sums – subset, sample, aggregate, explore, summarize, poke and prod, slice and dice your data to get the answers you need. Analyze surveys, dig into databases, improve quality, conduct research studies, forecast sales and prepare reports with ease. All without writing complex macros or queries. Find relationships, see patterns and trends, determine significance and use the past to predict the future.

Learn fast, work fast. Prepare for your analysis quickly with SPSS' full-featured Data Editor. Choose from a broad range of statistical routines, including those in specialized add-on modules, that produce full-color charts automatically. Hot button between charts and related numerical output. Share information using DDE and OLE. Put together a great presentation with powerful and flexible business graphics and a report writer. If you need help, the documentation is full of statistical "how to," and experienced technical support is just a phone call away.

SPSS for Windows – when you need more stats than a spreadsheet or database can offer.

MICROSOFT® WINDOWS™ COMPATIBLE

Order now and get a great value — only $695.
American Express, Discover, MasterCard or Visa accepted.
Unconditional 60-day money-back guarantee.

Fax (312)329-3668 or
Call (800) 543-5837

SPSS

Chicago • Washington, DC • Chertsey, UK • Gorinchem, The Netherlands • Munich • New Delhi • Singapore • Stockholm • Sydney • Tokyo • And Distributors Worldwide.

Circle 253 on reader service card

6 steps to healthy computing

1. Curtis Glass Filter Plus —
Relieves eye strain and fatigue, cuts glare up to 99%, and reduces VLF radiation up to 98%.

2. Curtis Monitor Arm —
Positions and adjusts monitor to optimum viewing angle to reduce glare and improve posture. Both arm and platform swivel 360°.

3. Curtis Keyboard Organizer —
Keeps supplies in reach and relieves tired, aching wrists with built-in wrist rest. (Wrist rest also available separately.)

4. Curtis Clip —
Holds copy next to monitor to reduce eye fatigue and neck strain by eliminating constant refocusing from desktop to monitor.

5. Curtis Wrist Rest —
Supports wrists at a more comfortable height to help reduce pain and fatigue.

6. Curtis Mouse Pad Organizer —
Built-in wrist support relieves sore, tired wrists. Pad improves pointing accuracy and pen/pencil tray organizes supplies.

Curtis offers many practical and low cost accessories that can reduce everyday physical stress and strain from computing.

Long periods of highly routine computing can harm your physical and mental well-being. That's why Curtis offers an entire family of ergonomic accessories to improve your computing health and comfort.

Choose from eye-saving Copy Clips and Glare Filters, wrist-saving Keyboard Organizers with Wrist Rests, and posture enhancing Monitor Arms. In no time, you'll be able to feel the difference these innovative Curtis accessories make in your personal computing comfort and well-being.

So why wait any longer? Six simple steps you can take today can mean more energy, greater productivity, and more job enjoyment tomorrow.

For more information, call Curtis at 1-800-955-5544, Ext. 240.
Ask for your free "Healthier Computing Guide" brochure.

Manufacturing Company, Inc.
CURTIS
30 Fitzgerald Drive, Jaffrey, NH 03452

©copyright 1993, Curtis Mfg. Co., Inc.
All Rights Reserved

FTC Crackdowns, Support Woes: Where Buyers Can Turn for Help

The Federal Trade Commission (FTC) has charged Business Computer Systems, a computer mail-order firm in Virginia Beach, Virginia, with failing to ship products on time (or at all) and with failing to issue refunds or credits as promised.

In papers filed in U.S. District Court in early March, the FTC asked, among other things, that the owners of Business Computer Systems (also known as BCS Group or Megasource) repay consumers the funds owed them for goods they never received.

Specifically, BCS founders Tal Shamgar (who allegedly also went by the names of Bob McGuire and Bob Jones) and David Masuck were charged with violating the Mail Order Rule by failing to ship products within stated time frames and by not giving customers the option to cancel their orders. The company was also charged with violating the rule by not making prompt refunds. (The rule requires that refunds on canceled orders must be shipped within seven days for cash or check sales and within one billing cycle for credit card sales.) The complaint also alleges that the owners misled customers by giving false information about when replacements for damaged or broken items would be sent.

Without admitting any guilt, BCS owners have agreed to comply with federal laws governing mail-order purchases and have established an escrow account from which they'll fund consumer redress. Carlton Bennett, attorney for the owners, said the company had already begun to take care of consumer complaints. "Ninety-nine percent of the complaints were misunderstandings," said Bennett, noting that refunds were already being processed prior to the FTC action.

As part of the agreement with the FTC, over the next six months BCS will provide the FTC with a monthly accounting of all refund requests, as well as information about when the refunds are issued.

Consumers who have outstanding complaints against BCS should write to Thomas Cohn, Division of Marketing Practices, Federal Trade Commission, Sixth St. and Pennsylvania Ave. NW, Rm. 238, Washington, DC 20580.

Cohn would not comment on whether the FTC's action against BCS was part of a larger effort to crack down on violators of the Mail Order Rule. He noted that the FTC receives numerous complaints on such alleged violations but does not have the resources to act on all of them. Cohn explained, "We look for a pattern of unlawful practices that affect a wide variety of customers in a wide variety of geographic areas."

By Roberta Furger

PC World Consumer Watch Editor Roberta Furger

Shop Talk

Dataworld Goes AWOL, Former Employees Start Repair Service

Can you tell me anything regarding the status of Dataworld in Pico Rivera, California? I recently purchased a computer from Dataworld and need to get in touch to ask a question.

Elbert Maloney, via CompuServe

Editor's note: We've received several letters asking about Dataworld, so we tried to contact the company. Its phones are disconnected, and its Pico Rivera offices are empty (but it does continue to pay the lease on the property and has made payments on other debts).

Although we were unable to reach the owners of the company, John and Paul Hsiao, we did speak with Bob Chang, the former sales manager of Dataworld. According to Chang, all of Dataworld's employees were laid off in October 1992, and the owners "burned all their bridges with employees, vendors, and customers."

Chang, with many of Dataworld's technical staff, has formed a service firm to repair laptops (which, he says, made up 90 percent of all Dataworld sales). The new firm, called Notebook Service Center (NSC), is located in Orange, California, and can be reached at 714/939-9140. NSC will repair Tandon laptops as well as Dataworld products.

Although the new company will not honor existing Dataworld warranties, customers whose products are still under warranty will receive a discount for any repair services.

Same Name, New Company

I am writing about a company called Bulldog Computer Products. It is located in Georgia and has been advertising for some time in various computer magazines.

BUG WATCH

ATI Mach32 Video Driver
A new version (Build 59) of this set of drivers for the ATI Graphics Ultra Pro graphics board is now available and fixes several bugs in the original drivers, including incompatibilities with the HP DeskJet printer and *WinFax Pro*. A "zipped" driver set, PRO59.ZIP, is available on both CompuServe (go ATITECH) and ATI's BBS for download. Users can also obtain a copy by calling ATI. One note to owners of Gateway 2000 DX2-66 systems: Gateway 2000 had not completed its own testing of Build 59 as of this writing and planned to continue offering an earlier version of the driver (Build 54) on its CompuServe forum (go GATEWAY) until testing was completed.
ATI Technologies
416/756-0718, 416/756-4591 (BBS)

Faxability Plus
Installation of Intel's *Faxability Plus for Windows* can stall or fail if the install routine is launched from within *Norton Desktop for Windows* or if any antivirus or erase-protect tools are memory resident during the install routine. Intel recommends users who encounter problems install the program from within *Windows'* Program Manager. If you're still unable to complete installation, disable any TSRs while you install the program.
Intel PC Enhancements Technical Support
503/629-7000

Kodak Photo CD
Kodak has confirmed that *Photo CD Access for Windows*, the software required to view and manipulate photos, and *Photo CD Access Developer Kit for Windows* will not reconstruct some "Poster" resolution images (2048 by 3072 pixels). High-contrast images are most likely to be affected by this problem, which causes streaks to appear across the image at that resolution.

Kodak has posted a fix for the problem on the CompuServe Multimedia forum; a disk version of the fix is also available from Kodak free of charge.
Kodak Information Center
800/242-2424 ext. 53

—Richard Melville

Have you run into a hardware incompatibility or a software bug? Call us at 415/978-3253 with the details. We'll investigate problems and report on those of broadest interest.

Richard Melville is an editorial intern for PC World.

My wife ordered a printer from this company just before Christmas, using a credit card. She didn't receive it, and after making several calls to the company, she was told Bulldog Computer had gone bankrupt and that new owners had purchased the rights to the name but not the assets (or liabilities) of the old company.

It seems questionable for a new entity to operate the company with the same name. I believe this to be misleading to the public and unethical business practice. How does the "new" Bulldog Computer Products compare with the "old" Bulldog?
Garey L. Cooper,
Huntington Beach, California

Editor's note: The name of a company is an asset that can be bought and sold, much like equipment or inventory. That's what appears to have happened in the case of Bulldog Computer Products, but the purchase has caused a fair amount of confusion.

According to sources, the old Bulldog went into foreclosure in December 1992. In January of this year, the trade name and remaining assets were purchased from the bank by new owners, who are now doing business under the Bulldog company name and using the same phone number as the old company, says Jim Drawdy, president of the new Bulldog Computer Products.

According to Drawdy, he and his partner did not buy the corporation and therefore are not obligated to fulfill outstanding orders or repay creditors. "The bank foreclosed and sold off the assets of the old company," says Drawdy, noting that any accounts receivable went to the bank to pay off existing debt. "We're trying to assist anyone who calls [with support needs]," he says, "but there's nothing we can do about old accounts."

Attorneys at the Augusta, Georgia, law firm of Fulcher, Hagler, Reed, Hanks, and Harper, which represents the owners of the old Bulldog Computer Products, would not comment on the status of the company or on what, if any, recourse is available to customers who never received products they paid for. James McNair, a paralegal with the firm, would note only that a press release may be issued in the future to discuss what happened to the old Bulldog Computer Products.

No Response From Dallas Fax

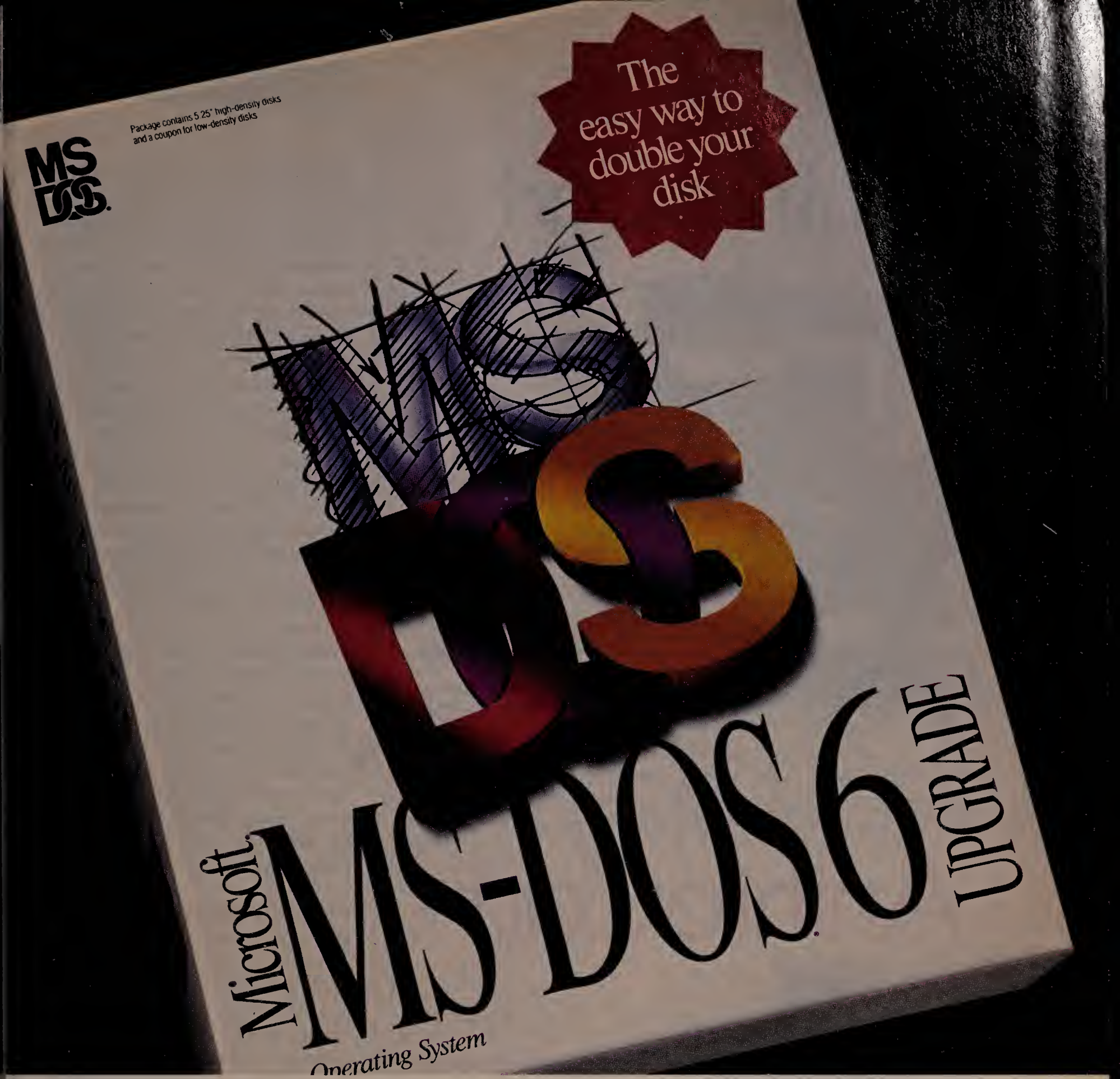
I am having serious trouble with a vendor called Dallas Fax, from whom I bought a 9600-bps modem with a lifetime warranty in March of last year. Some time ago I sent the modem in for repair, and I have been unable to get either a refund or a repaired modem. The modem never worked correctly, and now the company can't be found.
Greg Fields, Burke, Virginia

Editor's note: According to the Better Business Bureau for the metropolitan Dallas area, Dallas Fax vacated its offices and quit answering its phones in early February. The company had an "unsatisfactory record with the BBB," according to Director of Consumer Services Dianna Prickett; it received a large number of complaints and failed to respond to inquiries. Consumers complained that Dallas Fax failed to deliver products or process refunds. Because of these problems, Dallas Fax had its BBB membership revoked.

According to one former Dallas Fax customer, shortly before the company's phone lines were disconnected, employees began answering the phones as "Atel Computers." We were unable to obtain any additional information on Atel, however.

AddStor Tech Support: Help Needed

Two months ago I installed *SuperStor*, a data compression package from AddStor, to free up some space on my



YOUR HARD DISK JUST GOT DOUBLE THE ELBOW ROOM.

All those files and applications you've accumulated won't cramp your style anymore. Now our integrated disk compression doubles your disk space. Easily. Invisibly. Safely.

Simply type it in and your disk has double the space.*

And our improved memory management lets you extend your memory with just a few keystrokes. We've even added great new features like backup, anti-virus and undelete tools for users of both MS-DOS® and Microsoft® Windows.™

So if you need more space, integrated disk compression in the MS-DOS 6 Upgrade operating system makes it easy to stretch out.

Microsoft
Making it easier

*Compression results may vary depending on system configuration. © 1993 Microsoft Corporation. All rights reserved. Printed in the USA. For more information: In the 50 United States, call (800) 228-7007, Dept. RX3. Customers in Canada, call (800) 563-9048; outside the 50 United States and Canada, contact your local Microsoft subsidiary or call (206) 936-8661. Microsoft and MS-DOS are registered trademarks and Windows is a trademark of Microsoft Corporation.

AnthroCart®

LOTS OF SIZES AVAILABLE

HOLDS 150 LBS.

ADJUSTABLE

OVER 40 ACCESSORIES TO ADD

ANTHRO®

Call for a free catalog:
800-325-3841
6:30 AM – 5:00 PM, PST, M–F

Anthro Corp. • 3221 NW Yeon St., Portland, OR 97210 • (503) 241-7113 • FAX: (503) 241-1619

AnthroCart®

MOBILE

ADJUSTABLE

INCREDIBLY STRONG

LIFETIME WARRANTY

ANTHRO®

Call for a free catalog:
800-325-3841
6:30 AM – 5:00 PM, PST

Anthro Co. • 3221 NW Yeon St., Portland, OR 97210 • (503) 241-7113 • FAX: (503) 241-1619

300MB hard disk. As an Xbase developer, I store large amounts of sample data and program code from various clients and was running out of room. The product performed wonderfully until recently, when it gave me an error message and then refused to recognize the drive. Suddenly, two days' worth of programming efforts were inaccessible.

I called AddStor's technical support as soon as the business opened the next day and got a recording saying to leave a message. Surprisingly, there was no option to be put on hold and wait for assistance. I left a detailed message but was not called back that day. The next day someone did call back three times while I was out, but each time I called back I got the same recording.

I have never had so much trouble getting support for any software package.

James Slater, Denver

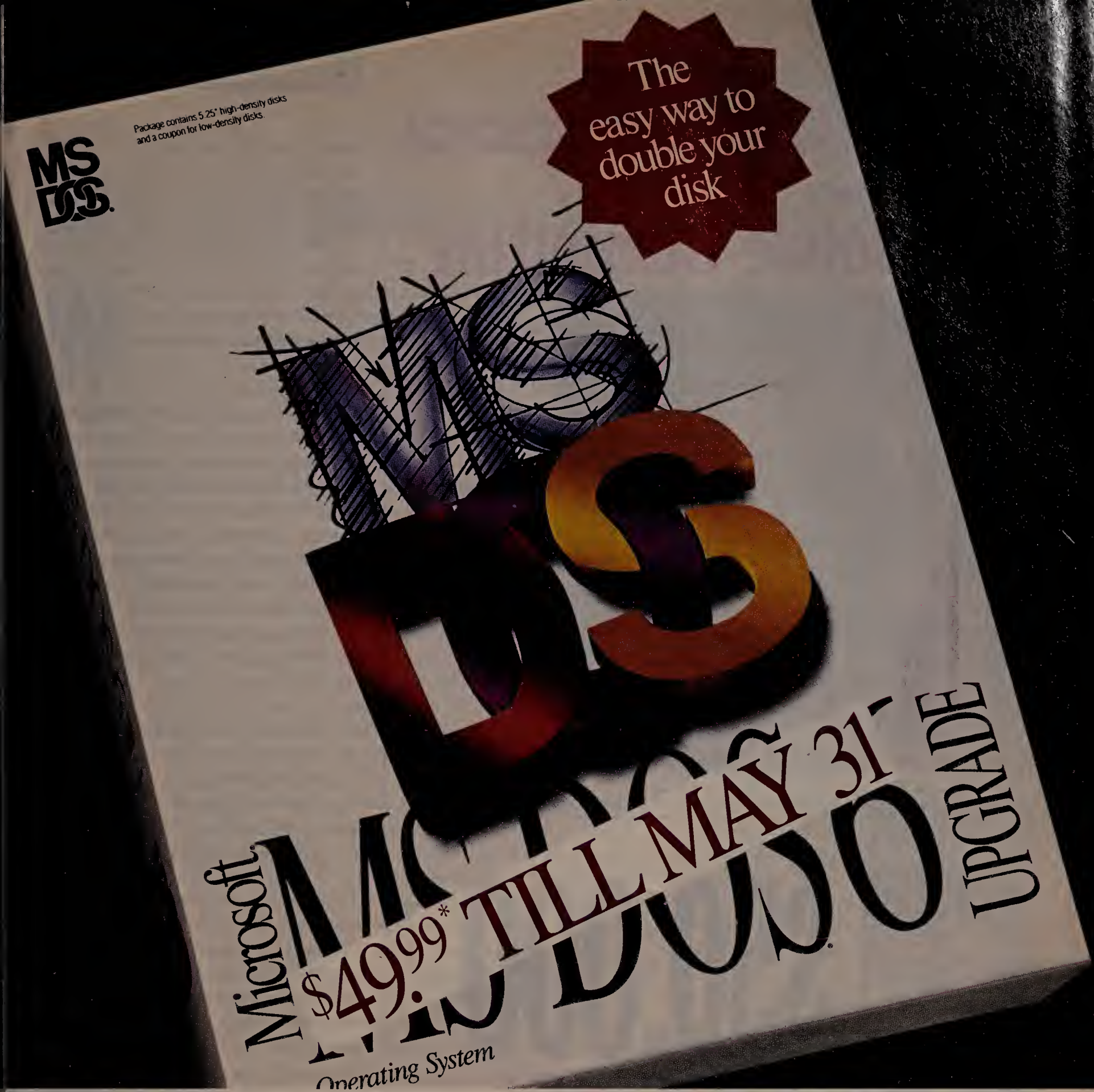
Editor's note: According to AddStor marketing manager Michael McMahon, the company's support volume had increased beyond the capabilities of its staff. To address these problems, the company implemented a new phone system at the end of January that includes a waiting queue. Customers calling AddStor technical support can now elect to be placed on hold until a technician becomes available.

Help for Frecom Customers

We at *PC World* have received several calls and letters from stranded customers of Frecom Communications, a Fremont, California, manufacturer of fax boards, modems, and fax software. The company went out of business at the end of last year. Frecom customers may be able to get support, however, through CXR Telcom Corporation, a San Jose, California, firm that had been manufacturing fax boards for Frecom prior to Frecom's demise.

According to CXR product manager Jim Schwalb, CXR began handling customer service calls for Frecom in September 1992 and is continuing to support Frecom products. Customers who bought Frecom products can obtain current software revisions free of charge from CXR. The company will also upgrade the fax boards or modems to current revisions at no charge if the technical support staff deems it necessary in order to fix a problem.

Schwalb says CXR is also working to fix



FOR A LIMITED TIME YOU'LL HAND OVER A LOT LESS.

This is your one chance to grab the MS-DOS® 6 Upgrade operating system at a price that's simply untouchable. Till May 31 you can get disk compression and improved memory management all for $49.99.

Now integrated disk compression easily doubles the space on your hard disk.** And our improved memory management gives you more free memory. In a snap.

To get information about this fantastic deal, call (800) 228-7007, Dept. RX3. Better yet, pick up the MS-DOS 6 Upgrade at your nearest reseller. Before this opportunity slips through your fingers.

Microsoft
Making it easier

*Offer good only in the 50 United States. Reseller prices may vary. **Compression results may vary depending on system configuration. © 1993 Microsoft Corporation. All rights reserved. Printed in the USA. For more information: In the 50 United States, call (800) 228-7007, Dept. RX3. For information only: Customers in Canada, call (800) 563-9048; outside the 50 United States and Canada, contact your local Microsoft subsidiary or call (206) 936-8661. Microsoft and MS-DOS are registered trademarks of Microsoft Corporation.

COMING IN JULY! PC World Special Report

Business Traveler's Guide to **Mobile Computing**

Our editors have been on the road again, preparing a special 20-page 'hands-on' report on the realities of Mobile Computing for business travelers. In it, you'll find these valuable articles:

- *PC World* and American Airlines examine the 'air-go-nomics' of using notebook computers aloft.
- Buyer's Guide to 22 notebook computers you *can* take with you.
- A survival guide with tips for successful computing 'on the road' in hotels, airports and other offices.

Don't miss this important section!

PC World — July issue

PC WORLD

$50,000 World Class Contest

You have a one-in-a-zillion chance of winning the lottery, but you can't lose with this FREE opportunity to win your share of $50,000 worth of top-rated hardware and software products.

Fill out the PC World 1993 World Class Award ballot, and mail it in today! Turn to page 95 for details.

Guaranteed prizes for hundreds of early-bird entries!

bugs in the Frecom fax software. CXR technical support can be reached Monday through Friday, 8 a.m. to 5 p.m. (PST), at 408/955-0561.

Unfortunately, Frecom customers who are owed money for orders placed prior to September of last year are out of luck, since CXR has no records to support those claims and does not have access to those funds.

NEC Kudos

I purchased a new NEC CD ROM drive by mail order in October 1991. Although I had niggling problems from the start, I never notified the vendor and didn't get around to contacting NEC until after the warranty had run out. In fact, I didn't even bother to send in the warranty cards.

When I finally called NEC, I was only hoping to get the address of a service center to which I could send the drive for repair at my own expense. To my surprise, however, the NEC technical support manager told me to return the drive to NEC for repair. The drive came back to me a few weeks later, *without* an invoice for repair costs, and it now works perfectly.

You can be sure there is more NEC hardware in my future.

Boyd C. Swingley, The Azores, Portugal

Think you've gotten a raw deal—or a great one? Mail the details to Consumer Watch, PC World, *501 Second St., #600 San Francisco, CA 94107; or send them electronically to the Consumer Watch forum on PC World Online; MCI Mail, PC World Editorial; CompuServe, 74055,412; or 415/442-1891 (fax). We'll investigate complaints and publish letters with broadest interest.*

POWER TIP no. 283

Multiple WordPerfect Copying

Here's a shortcut for copying the same block of text to several locations. Use <Ctrl>-<F4> to copy the block the first time; then move the cursor to the next place you want to copy the text to and press <Shift>-<F10><Enter>, which inserts the last piece of text that you moved or copied.

Carol N. Landsman
San Diego

Down the Hall and 1200 Miles Away

When your company sets up shop in another state, communication with the home office can become a thorny problem. Phones and fax machines can only do so much when you and a distant colleague need to review a spreadsheet at the same time. And those overnight mail bills can add up, too. This month J. Clark Ribordy, a CPA and controller at the Colorado Springs office of Sage Health Services of Evansville, Indiana, explains how he helped set up a wide area network that lets him work with his colleagues in the home office as if they were just down the hall. —*Ed.*

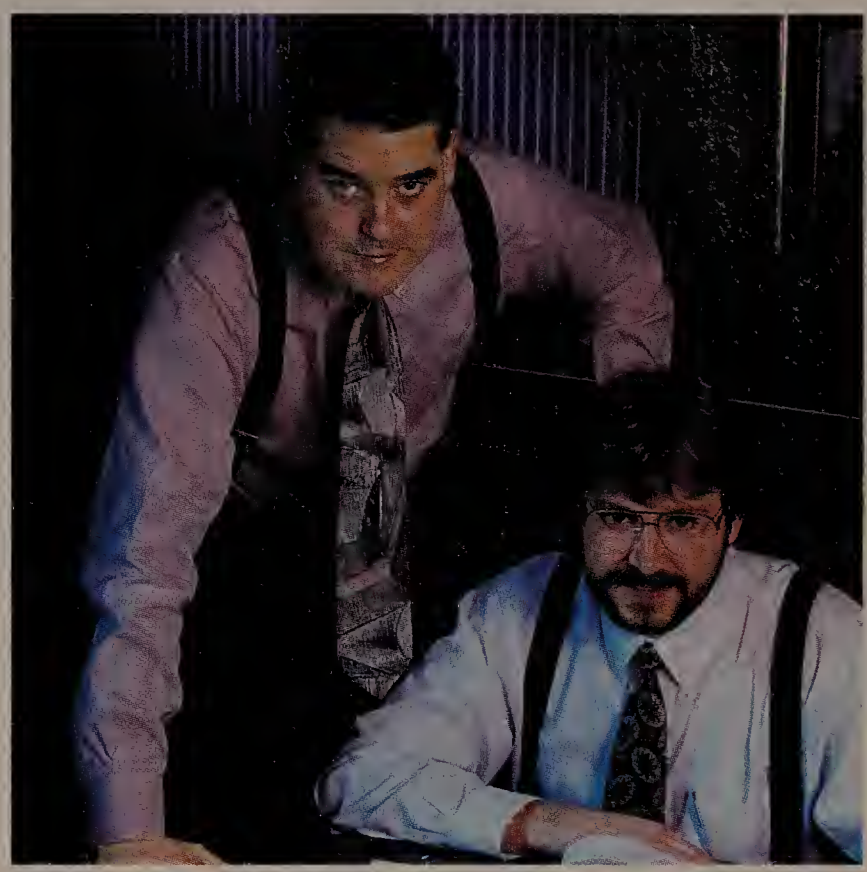
Making the Connection

As an accountant, I use my PC for practically everything I do, whether it's setting up a complicated *Excel* spreadsheet or looking at my schedule in *Futurus Team*. As much as I value my computer, however, I never thought about how much time computers save until my company opened another office 1200 miles away.

We're in the business of long-term health care. There are 24 employees in the home office, and 16 in Colorado Springs, Colorado. Routinely, life-and-death crises arise involving patients, their families, and the health care sites we manage. In these situations—not to mention in our day-to-day business operations—it's critical that the home and regional offices communicate immediately. But the distance between offices was making quick communication problematic.

For example, when I wanted my boss to view one of my worksheets, I had to print it, reduce it to fax size on a copier, and then ask our administrative assistant to fax the copy to the home office. Since the fax line was usually busy, this process could take a few anxious hours. Then the assistant on the other end would have to copy the murky fax back onto paper. By the time my boss tried to decipher them, my miraculous mathematics were about as legible as your average hieroglyphics. He'd call me to tell me he couldn't read the worksheet, and I'd end up paying Ma Bell for the privilege of reading the numbers to him or spending $12 to send a copy by overnight mail.

As a result of such misadventures, we were spending almost $900 a month just on phone bills and mail costs between offices, while we threw an unimaginable amount of money down the drain in unproductive labor.



J. Clark Ribordy (left) and Steve Knust of Sage Health Services.

As the computer "expert" in our office, I volunteered to look into solutions, and found myself working hand in hand with Steve Knust, the computer networking expert in the home office. Our goal was to find a better way to share accounting and general office information between the two offices.

One option we considered was to set up a video teleconferencing system in each office that would let us hold meetings in real time. A little investigation revealed that the $70,000 price would give us some fancy video cameras and monitors, but it still wouldn't let us share computerized information.

Making a Net Work

Steve hit on a better solution: Set up a local area network in each office and link them through a dedicated data line. It would, in the end, allow our offices to communicate as if we were just down the hall from each other. This sounded simple and elegant, but it took some doing to get all the pieces in place.

Steve devised a system that took advantage of our existing computers and software, but added several new capabilities.

We first purchased two ALR 386 PCs—one for each office—to act as our network file servers. We installed Novell NetWare on each and linked the servers to several of our existing Dell 386 and 286 PCs. We also purchased two additional 386 PCs to act as gateways to our AS400 minicomputer, which we had long used to handle our accounting data. The gateways allow the mini to download to the PCs, and the PCs to upload to the mini. In addition, we picked up a router to determine what route the information would take between the two networks.

We also purchased ethernet cards for all the workstations, a high-speed laser printer, two 650MB SCSI hard disks, Teflon coaxial cabling, a remote controller for the AS400, a synchronous adapter and several Xircom pocket ethernet adapters, and a WAN electronic-mail module for *Futurus Team*.

Key to the new system was a dedicat-

SHARE THE TURBO POWER!
See us at:
COMDEX East Hall, Booth #1232
If increasing productivity and maximizing the use of costly peripherals is a priority, shift into high gear with BYTEWAY and BYTELINK TURBO
Discover why corporations such as AT&T, Hewlett-Packard and Virginia State Lottery are choosing our TURBO SHARING POWER

- 4, 8, 12 and 24 fully programmable ports to choose from.
- All parallel, serial bi-directional or combinations of parallel and serial ports to meet the needs of specific applications.
- Fully *WINDOWS* compatible, Bytewin printer select software makes choosing a printer from within applications completely transparent for the user.
- Bi-directional link supported for modems, plotters and main-frames.
- Simultaneous input-output and dynamic buffers up to 4Mb for increased data throughput.

FREE $295 value
Bytenet, file transfer disk access, E-mail software for serial port units.
Call 1-800-363-8156 for details
Tel.: (514) 630-5832 • Fax: (514) 694-6973
PROTEC MICROSYSTEMS INC.
Sharing PERIPHERALS IS OUR BUSINESS
All trademarks are properties of their respective companies.
Circle 198 on reader service card

ed digital telephone link we leased from SP Telecommunications in Livonia, Michigan. Like Sprint, MCI, AT&T, and other large telecommunications firms, SPT offered to lay the data link and install everything, including the telephone jacks. The cost of the data link, including installation, was a flat rate of $650 per month. But there was a catch: We had to have the link multiplexed—split into two bandwidths—in order to accommodate connections between both the network and the minicomputer. So we also had to purchase a multiplexing data service–channel service unit, a modem that "interprets" among the router, the AS400 phone link, and the data link.

Finally, we invested in security. To avoid losing data during a power failure, we purchased a tape backup unit, a backup power supply, and dual hard drives that duplicate each other in case one should crash.

Wave the Magic WAN

The grand total for our purchases—hardware, software, cards, adapters, and cabling—came to approximately $56,000. It might sound like a big outlay, but the consensus is, it's been worth it.

Our new system allows everyone in the regional office to access any file on the server in the home office, and vice versa: It takes about 15 seconds for me to call up a spreadsheet that's sitting in a PC 1200 miles away. I can make changes to it, save it, and have it printed out in Evansville. I can use *Futurus Team* to keep in touch with my colleagues and do my scheduling. Better still, I can use the Chat function in *Futurus Team* to type a conversation in real time with someone in the other office—and say goodbye forever to steep phone bills.

With the dedicated data link, there's no per-access charge, no telephone charge, and no modem; and the fee remains the same no matter how many times we use the system. We estimate we're saving about $250 a month in telephone and mail costs.

But the major return on investment comes in lower labor costs. Before we installed the network, it took two assistants nearly full time just to handle all our interoffice communication, to the tune of at least $40,000 per year. Today, the assistants are doing more productive work in accounting and data entry, and we've cut our receptionist's hours by half. And since my boss and I no longer play "spreadsheet tag," decisions that used to take hours now take a fraction of that time. We've calculated that the four salaried managers who use our networks save anywhere from 10 to 20 percent of their time, worth at least $33,000 in increased productivity. Add up the saved costs of two assistants, the $3000 per year in phone and mail costs, and a minimum of $33,000 in increased management productivity, and we've recouped our entire $56,000 investment in the first year alone.

A One-Month Project

Our project proceeded surprisingly quickly: We were able to do all our research, purchase all the components, and set up the entire system in less than a month. Steve had to invest a couple of weeks up front to do the research and set up the hardware and software, but today, managing the network doesn't take him more than a couple of days each month. Considering the time and expense we're saving, setting up our network is one of the smartest business decisions we've made.

If you use PCs to manage people and other resources in a business environment, we want to hear from you. Send your article idea—including a brief outline of your company, job, problem, and solution as well as your name, address, and phone number—to Real Problems, Real Solutions, PC World, *501 Second St. #600, San Francisco, CA 94107; or send it electronically to the Real Problems, Real Solutions forum on PC World Online; 415/442-1891 (fax); or call us at 415/978-3224. We pay $300 per published column. Sorry, we cannot acknowledge unpublished materials.*

POWER TIP no. 284

Delete Without Asking

You don't always want to be prompted (Y/N) when you use the DEL *.* command—especially if you use it in a batch file. Try ECHO Y | DEL *.* instead; this will delete all the files in your current directory without asking for permission first.

Jason K. Douglas
York, Pennsylvania

Exercise Your Video ... Stretch It!

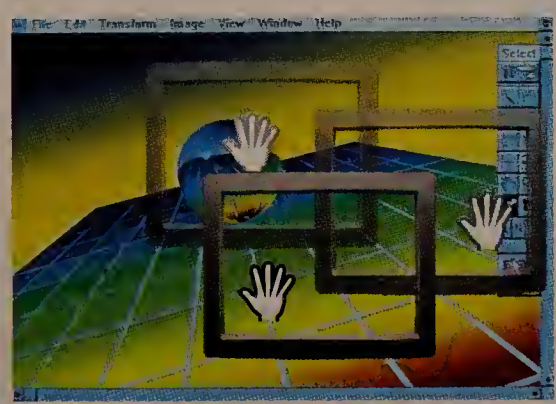
Why settle for an out-of-shape graphics board? Let ATI's new GRAPHICS ULTRA+ and GRAPHICS ULTRA PRO cards pump up your computer with graphics and multimedia video acceleration.

Only the GRAPHICS ULTRA+/PRO cards come ready to accelerate[1] multimedia applications under Windows. Stretch small video images to partial or full screen for better visibility ... and maintain smooth dynamic motion (when others fall behind).

ATI's *mach32* Accelerator Chip adds the muscle to run Windows, NT, OS/2 and CAD fast... even faster than other local bus solutions. With 2.0MB of video memory, ATI accelerates 1024x768 in 65,000 colors. Run resolutions up to 1280x1024, colors up to 24-bit, and sit-up to flicker-free graphics at 76Hz refresh rate. Plus, the best software support of ANY accelerator product with ATI, VGA, VESA or 8514/A drivers.

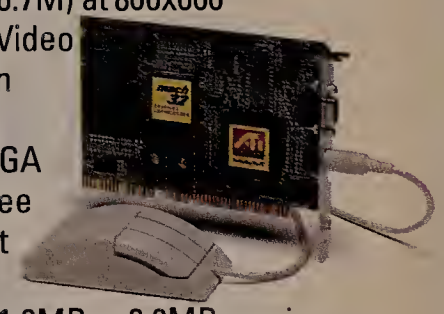
accelerated by mach32 ATI TECHNOLOGIES INC.

Exercise your options under Windows with the FlexDesk Control Panel or use DeskScan to pan and zoom across a virtual desktop. And our exclusive CRYSTAL FONTS smooths TrueType for laser-quality text right on-screen.



GRAPHICS ULTRA +

- Accelerated 1024x768 at 65,000 colors
- True color (16.7M) at 800x600
- Multimedia Video Acceleration
- Fast zero wait-state VGA
- Includes three button inport mouse[2]
- Available in 1.0MB or 2.0MB versions
- 5 year warranty
- Priced from $399.00[3]



GRAPHICS ULTRA PRO adds

- Even faster performance with VRAMs
- Accelerated 1280x1024 at 256 colors up to 74Hz non-interlaced
- Available in ISA, EISA and Micro Channel versions
- Priced from $599.00[3]

Avoid low impact graphics. Shape up with ATI Graphics and Multimedia Video Accelerators.

ACCELERATORS · GRAPHICS · MULTIMEDIA · COMMUNICATIONS

MICROSOFT WINDOWS COMPATIBLE · PC MAGAZINE EDITORS' CHOICE · CADalyst · PC Computing MVP WINNER · indeo INTEL VIDEO TECHNOLOGY

ATI TECHNOLOGIES INC. Perfecting the PC

ATI TECHNOLOGIES INC.
3761 Victoria Park Avenue
Scarborough, Ontario
Canada M1W 3S2
Tel: (416) 756-0718
Fax: (416) 756-0720

Copyright © ATI Technologies Inc., 1993. All company and/or product names are trademarks and/or registered trademarks of their respective manufacturers. [1]Accelerates Indeo Video, RLE and Video 1 compressed files under Video for Windows. QuickTime for Windows support is planned. Performance varies depending on system configuration. [2]ISA versions only. [3]Suggested retail prices, dealers may sell for less. Prices and features are subject to change without notice.

Circle 5 on reader service card

SEE US AT WINDOWS WORLD, BOOTH #W7038

"No other program lets you create presentations so quickly and effortlessly, and none pays so much attention to guiding you through the process."
PC Computing 12/92 MVP Award

"Remarkably easy to use..."
Windows Magazine 2/93

"When you've got the best product going, you can afford to relax. In this case, Lotus didn't. Freelance is a winner."
PC World 1/93

The first rule of any presentation is keep it simple.

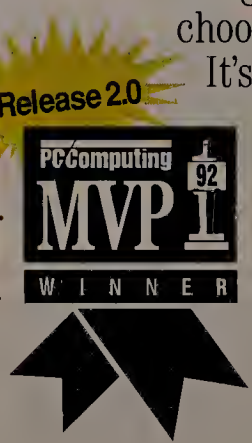
And it doesn't get any simpler than this.

Introducing Freelance Graphics for Windows, Release 2.0.

The first release of Freelance Graphics® won every major award in the presentation graphics category.

Now Lotus® enhances Release 2.0 with new features and improved usability that actually make the simple three-step process even simpler. In fact, it's now so fast, so friendly and so automatic, it's actually changing the way people use presentation graphics software.

Now people not only use Freelance Graphics to easily create beautiful last minute presentations, they use it to quickly generate handouts, even for informal meetings.



Let our SmartMasters be your guide.

Only Freelance Graphics has SmartMasters™ to automatically guide you through every step of the design process. You simply select the look you want, choose a page layout, and start filling in the blanks. It's that easy.

Just one click brings you a complete array of drawing, charting and editing tools, plus on-screen galleries for chart types, symbols, tables, and org. charts. You'll easily create professional quality output in overhead, slide, handout, and screen show formats. And a new toggle switch allows you to instantly view your presentation

*Offer valid in U.S. only. In Canada, call **1-800-GO-LOTUS**. ©1993 Lotus Development Corporation, 55 Cambridge Parkway, Cambridge, MA 02142. All rights reserved. Lotus a

See How Simple It Can Be.

Order your FREE, full-featured working model today. See for yourself just how easy it is to create great presentations with Freelance Graphics for Windows, Release 2.0. Just complete and mail this card or call **1-800-872-3387, ext. 8648.** Offer expires 9/30/93.*

Name:

Title:

Company:

Address:

City: State: Zip:

Daytime Phone: ( )

My disk format is: ☐ 3½" ☐ 5¼" Do you currently own a graphics package? ☐ Yes ☐ No

Lotus Freelance Graphics 2.0

Presentation Graphics for Windows

*Please allow 1-2 weeks for delivery. Offer good while supplies last, in U.S. only. In Canada call **1-800-GO-LOTUS.**

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST-CLASS MAIL PERMIT NO 9215 SALT LAKE CITY UT

POSTAGE WILL BE PAID BY ADDRESSEE

FREELANCE GRAPHICS FOR WINDOWS
WORKING MODEL OFFER
LOTUS DEVELOPMENT CORPORATION
PO BOX 31602
SALT LAKE CITY UT 84131-9959

Creating a presentation of even (100 lides) is absurdly easy—and much asier, in many ways, than with ompeting products..."

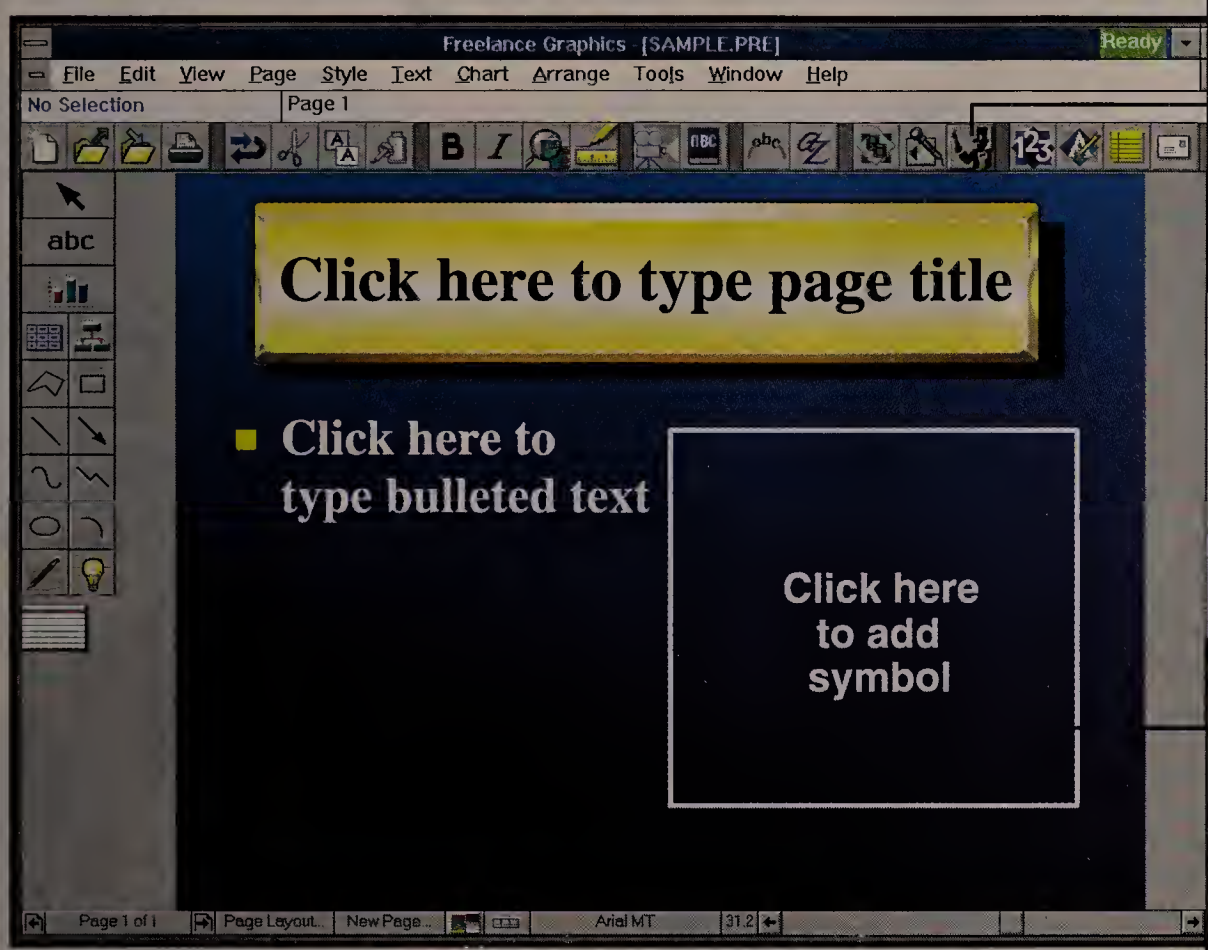
PC Week 2/15/93

"Inviting and even fun to use. More important, I produced a presentation in about an hour."

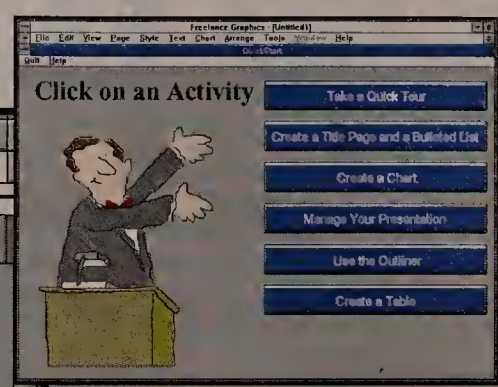
BYTE 2/93

"There's bad news for the competition... Freelance Graphics for Windows 2.0 is even better than its predecessor. This program is about as straightforward and easy to use as they come.

PC World 1/93

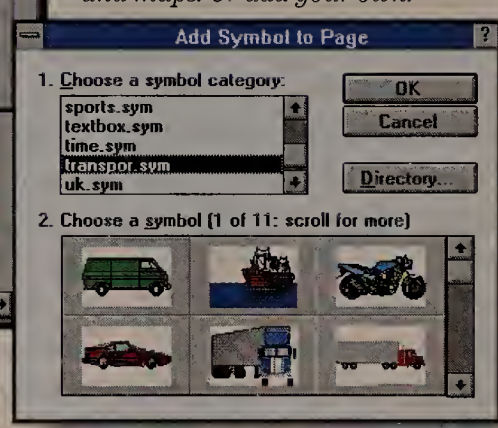


Single-click access to powerful presentation tools makes Freelance Graphics easy to use.



Just click to view the animated QuickStart tutorial. It walks you through your first presentation in under 30 minutes.

Just click to browse through a gallery of over 500 editable symbols and maps. Or add your own.



in black and white or color. Freelance automatically optimizes the design for printing either.

You'll be amazed at the beautiful results you immediately generate, without really trying. In fact, you couldn't look bad even if you tried.

Is the world's easiest presentation graphics software easy enough for you?

Call **1-800-872-3387, ext. 8648;*** to order your free, full-featured working model. You'll see just how simple it can be. While you've got us, ask about our special competitive upgrade price.

And for those just getting into Windows,™ keep in mind that Freelance Graphics is also included in Lotus® SmartSuite:™ four award-winning Lotus Windows applications at a very attractive price.

Lotus Freelance Graphics 2.0

Presentation Graphics for Windows

eelance Graphics are registered trademarks and SmartSuite and SmartMasters are trademarks of Lotus Development Corporation. Windows is a trademark of Microsoft Corporation.

1-2-3 LEAPFROGS EXCEL

A dynamite interface, an arsenal of charting features, and powerful version and database managers make the new 1-2-3 a winner.

TEST DRIVE *1-2-3 4.0 for Windows* is a solid winner. The program remedies most of the glaring shortcomings of *1.1*, the previous *Windows* release; it appropriates some of *Excel*'s and *Quattro Pro*'s best ideas; and it pushes the functionality envelope with a brainy, innovative database system plus a unique work-group Version Manager that offers a whole new way to use spreadsheets. While a few of *4.0*'s features don't yet have the versatility found in competing products, Lotus is finally on the right track.

Catching Up

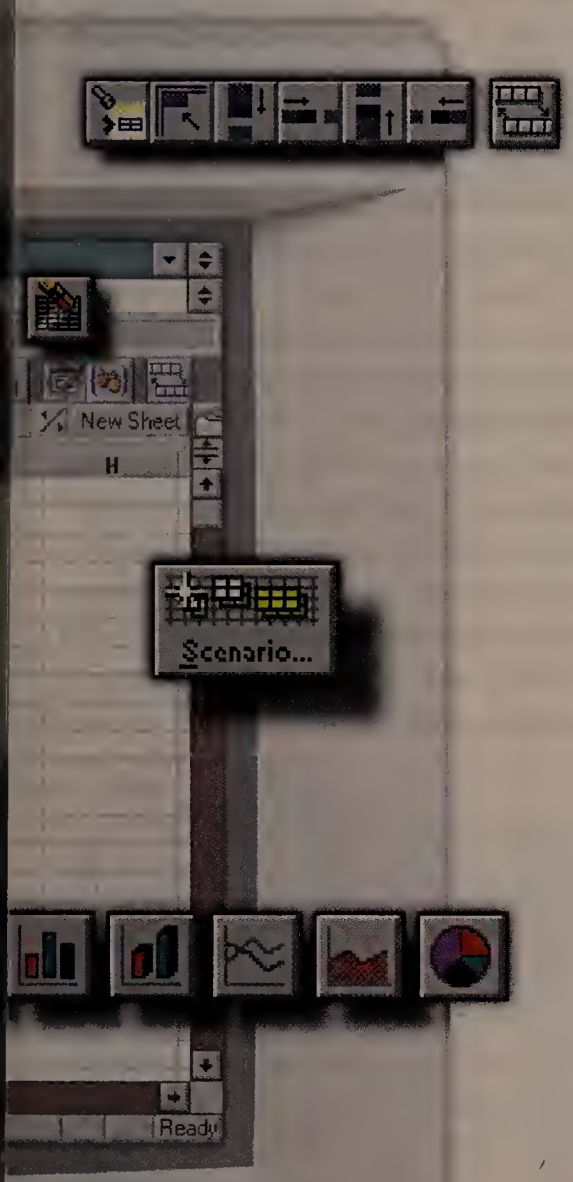
With release 4.0, the future of information systems becomes clear: a world of modular systems made of networked servers and PCs running client/server databases, workgroup software, and familiar business applications that enable workers to collaborate and communicate instantaneously. In this world, the spreadsheet will be your data center—an arena for assembling, analyzing, and presenting information from a variety of local and remote sources. Already, spreadsheet vendors are shaping products to this vision, concentrating on database access, presentation-quality graphics, and analytical tools. Release 4.0 brings this vision a step closer to reality.

The Look! The Feel! The Je ne Sais Quoi!

You'll see the difference in the interface with its streamlined, logical menu structure

Edited by Russell Glitman

AND QUATTRO



and well-organized dialog boxes. If you're upgrading from release 1.1, you'll spend a lot less time poring over the menus, wondering where the programmers have stashed some feature you need. And while the "classic" *1-2-3* slash-key menus are still there, you probably won't need them.

New tool bars offer myriad menu shortcuts, with well-designed intuitive icons. The status bar at the bottom of the worksheet is a mini-menu that lets you change the numeric format, the font, and other features of the current selection.

Menus and tool bars change as you select a cell, a graph, a database query, and so on. Ideally, this feature would provide an easy-to-grasp view of your options, but it needs some work. We found the context-sensitive tool bars less helpful when our task spanned several contexts; the tool we needed always seemed to be on the other tool bar. In contrast, *Excel*'s multiple–tool-bar approach is less aggressive but more flexible.

Performing Mouse Tricks

Release 4.0 has learned all the current mouse tricks. There's drag-and-drop for moving and copying (although you can't use it to insert a selection, as you can with *Excel*, and there's no warning if you overwrite destination cells). You can select entire columns and rows, and you can select (though you can't name) discontiguous ranges—a real boon for speeding up spreadsheet tasks.

Besides improving the basics, Lotus has thoughtfully standardized the left and right mouse button conventions. Click the right button, and you'll see a menu from which you can change the properties of a cell or other object; double-click, and you go to the dialog box where the object was created. For instance, right-click on a graph title, and you can change its font, box pattern, and so on; double-click to change its wording and placement. Another nice touch: The mouse

News Monitor

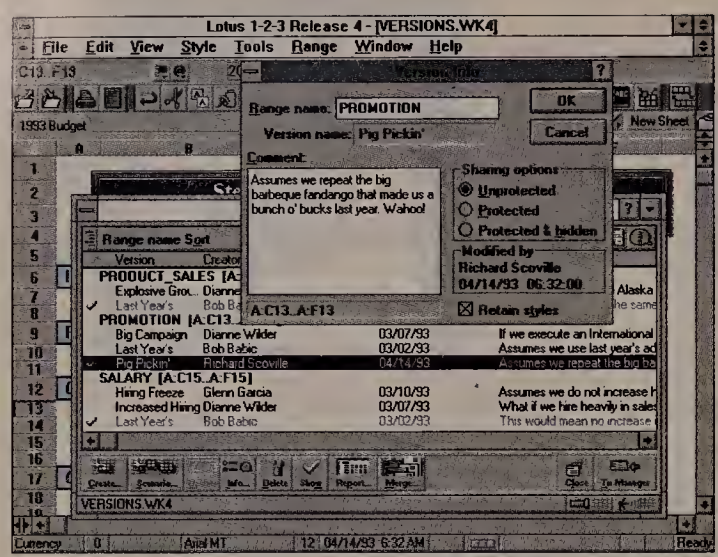
PLUG-AND-PLAY PC? Microsoft and Compaq will codevelop a new generation of easier-to-configure desktops; advanced portables; and hand-helds with pen interfaces and wireless communications. The companies will focus on developing *Windows*-based systems that are simpler to set up and use and that will include as standard such features as CD-quality audio, CD ROM drives, and built-in networking.

The agreement follows the March announcement of the Plug and Play ISA specification, a move by Microsoft, Compaq, Intel, and others to create a design for future PCs—systems that will configure software and hardware components automatically, with little user involvement (yes, like the Macintosh). No product details have been announced, and industry watchers don't expect to see Plug and Play products before the end of the year.

ACROBATIC FORMATTING: Adobe will introduce a software family able to convert virtually any document into a generic format that can be read by other computers, regardless of hardware platform, operating system, or even the application used to create the original document. The Acrobat family will include a Portable Document Format (PDF) Writer, which will translate even heavily formatted documents, such as graphics, desktop publishing, or spreadsheet files, into the PostScript-like PDF. Users with other Acrobat products can then view, store,

(continued on page 45)

PHOTO ILLUSTRATION: JEFF BERLIN; ILLUSTRATION: CHIP WASS



VERSION MANAGER provides sophisticated what-if tools.

pointer changes appearance to let you know whether a click will select a cell, a graph, an object, a graph axis, a line, a query object (more about query objects later), and so on.

3-D Without Funny Glasses

One of the great spreadsheet innovations is 3-D worksheets. Introduced in *1-2-3* release 3.0 (for DOS), they provide flexibility for model building and organizing work that a 2-D worksheet such as *Excel* can only approximate. Borland greatly improved this feature in *Quattro Pro for Windows* with a simple notebook metaphor. *1-2-3* mimics this paradigm: Its pages are nameable, with easy-to-select tabs for each worksheet. You can use sheet names to reference ranges in formulas, which makes them easier to read, and you can right-click on the corner of the sheet to change its global formatting properties. But in marked contrast to *QPW*, release 4.0 cannot link the sheets into named groups for formatting. Group formatting is still an all-or-nothing venture, as it was in the *3*.x releases.

Did we hear you ask about macros? Yes, *1-2-3 4.0 for Windows* has them, and fortunately, they are no longer keystroke oriented. Instead, there are over 250 new macro commands, such as {SELECT} to select ranges, {MENU-CREATE} to modify the menu bar, and {SET} to control the interface. As in release 3.0, you record your actions in a special Transcript window, test and edit the macro there, then paste the macro commands back into the worksheet and name them to create the macro. However, the new release can also run all your old DOS *1-2-3* macros.

Decorative Touches

The new *1-2-3* has overtaken the competition at spreadsheet formatting. Anytime you want to decorate, you can select from one well-organized palette of 256 colors and another with 64 fill patterns. You can align all kinds of cell entries, not just labels; wrap text within a cell; and—a first for spreadsheet programs—rotate the entries within cells. Formatting styles are now easy to define and use. On the other hand, you still cannot create your own numeric formats, though *1-2-3* partially compensates for this shortcoming with additional @functions.

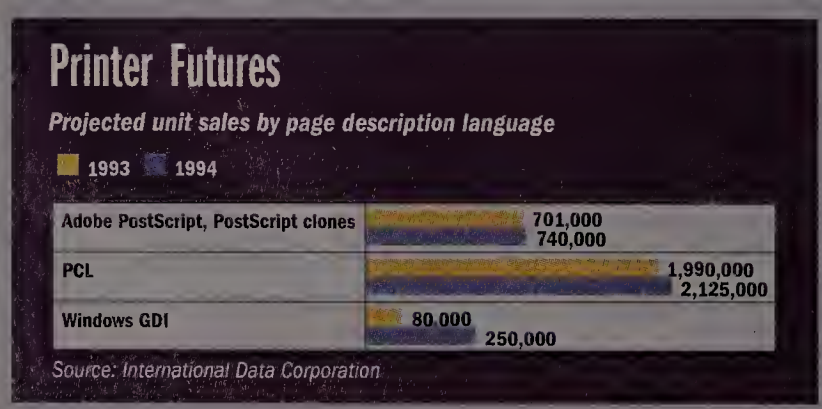
And speaking of @functions, you'll note 110 new ones. Many mimic those found in *Excel 4.0*, including math, engineering, financial, and statistical functions.

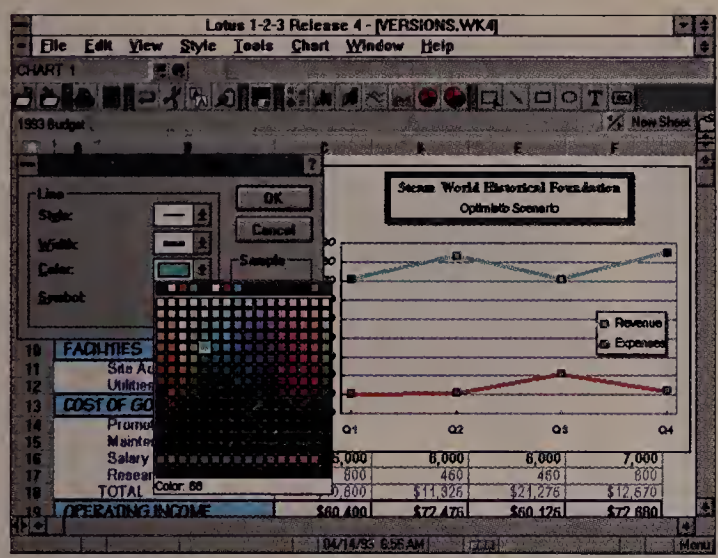
New Options for Low-Cost "Laser" Printing:

Good news for printer buyers—three technological developments will create lower-cost printers in 1994, according to industry analysts. The latest advance involves SoftBand, an image rendering technology developed by Phoenix Technologies. This banding technique reduces memory requirements of 600-dpi PostScript Level 2 printers from 6MB of DRAM to 2MB. (The technology is incorporated in Phoenix's PostScript Level 2 interpreter, PhoenixPage.) You may see low-end printers using PhoenixPage for close to $1000, says Paula Bursey, industry analyst at DataQuest. Currently, PostScript printers range from $1900 to $6000. Phoenix says 600-dpi PostScript printers with PhoenixPage will be available from a number of vendors by November of this year.

Another development likely to lower prices involves the printer's light source. New LED printers employ printheads with fewer moving parts than traditional laser printers. These units are less expensive and could prove more reliable. Some LED printers are already on the market, such as Okidata's 300-dpi OL 400, which carries a street price of around $590. Other vendors offering LED products include Samsung and Kyocera. And more such units are on the way, according to Marco Boer, senior printer analyst at International Data Corporation (IDC). "Next year, you'll see more vendors come out with LED printers—many in the $500 range," Boer says.

For *Windows* users, GDI (Graphics Device Interface) printers will offer a third way to save money on high-quality printing. GDI printers don't require a controller, the printer mechanism that translates file information between the PC and the printer. Instead, these printers are built to understand the *Windows* GDI command set and let your PC do the thinking. They also provide faster *Windows* printing. The only drawbacks: GDI printers work only with *Windows*, and they aren't suitable for networks with non-*Windows* computers because GDI printers can't interpret PCL or PostScript print jobs. Vendors are working steadily to improve GDI printers, and many more models will be available during 1994, according to IDC's Boer. He expects GDI printer unit sales will rise from this year's 80,000 to 250,000 in 1994 and jump to 560,000 in 1995.





YOU CAN EDIT GRAPH OBJECTS right on the worksheet.

Like *Excel*, *1-2-3 4.0 for Windows* sports a graphic annotation layer. You can rotate and flip objects and text—capabilities you don't get with competing products. A set of "designer frames" lets you add drop shadows, picture frames, and other borders to graphs. But you can't use drag-and-drop to copy graphic objects as you can in *Excel*. Nor can you snap objects to the worksheet grid, a trick that lets *Excel* users create precision drawings.

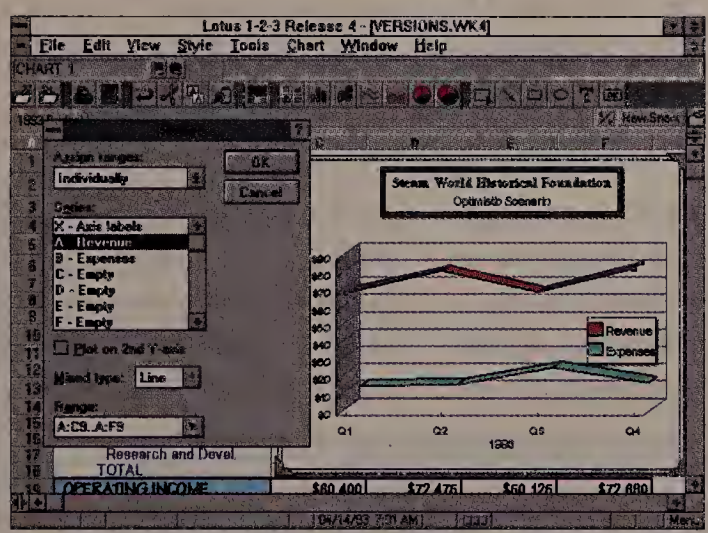
As for graphs, release 4.0 has not only corrected the problems of the previous version, its graphics are now simpler and more flexible than *Excel*'s or *QPW*'s. You no longer need go to a special window to edit a graph—you can do all your work right in the graph itself. If you want to print just the graph, select it and go to the print menu. If you want to arrange all your graph objects on a single worksheet page as you can in *QPW*, just move them there.

There's a slew of new chart types, including radar charts and error bars. Graphs can include up to 23 series, and you can assign any series to the left or right *y*-axis. Editing graphs is much easier than in *Excel*, especially adjusting the series, setting up multiple *y*-axes, and positioning titles.

So when it comes to basic spreadsheet functionality, *1-2-3 4.0 for Windows* is on a par with its *Windows* peers. For work-group computing, however, *1-2-3* offers a couple of striking innovations, including a totally revamped database manager and, for playing what-if with your colleagues, the new Version Manager.

This popular spreadsheet activity was made easier by *Excel 4.0*'s Scenario Manager, which lets you create multiple what-if scenarios and store them with a worksheet. *1-2-3 4.0 for Windows'* Version Manager greatly extends this capability.

Version Manager lets you record and organize versions, then toggle between them. A *version* is a set of alternative values, formulas, and styles assigned to a named range—what-if scenarios, for instance. Version Manager automatically records the user's ID and the date for each version. Once you've created alternative versions for ranges, you group them into scenarios with the Version Manager Index. Here you choose versions you want grouped together and store them as a named scenario. A best-case scenario, for instance, might include optimistic projections for Sales and other named ranges, such as Cost of Goods and Administrative Expenses. The same version can appear in several scenarios.



REORGANIZE CHART DATA series easily with 1-2-3 4.0.

This mix-and-match flexibility of versions and scenarios lets you handle complex models easily. In contrast, *Excel*'s scenario manager restricts each scenario to a single set of values, and you can't use alternative formulas or styles.

When it's time to sort through the alternatives, the Version Manager Index provides a

News Monitor

(continued from page 43)

annotate, and print PDF files with essential formatting, graphical elements, typefaces, and text intact. Acrobat products are expected to ship in a *Windows* version by June with a street price of about $100 per user in five-user quantities, according to John Warnock, Adobe chairman and CEO. The company expects to release DOS and UNIX versions by fourth quarter 1993. Adobe says Acrobat products will store documents with their underlying file structure and formatting information. As a result, Acrobat applications can compress PDF files up to ten times more efficiently than imaging applications can compress their files. PDF files also offer better resolution on monitors and printers. In addition, because PDF files include text, you can search for words or even copy chunks of text into other applications.

GROUNDED NOTEBOOKS: At least one airline is banning the use of notebooks during takeoffs and landings, and others may follow, according to an airline trade group. Northwest Airlines now prohibits notebook use below 10,000 feet, following a recommendation in early April from the International Air Transport Association (IATA) that carriers limit the use of all electronic devices, including notebook PCs, tape players, and portable CD players, during takeoff and landing. The IATA has members from 213 airlines.

The ban was prompted by growing concern that these devices may generate interference that affects aircraft instrumentation, says IATA spokesman

(continued on page 47)

Continued from page 45

master list of scenarios and versions. You can scroll through them and select a set to pop into the worksheet. The Index can also sort alternatives by criteria such as range name, author, version name, and date.

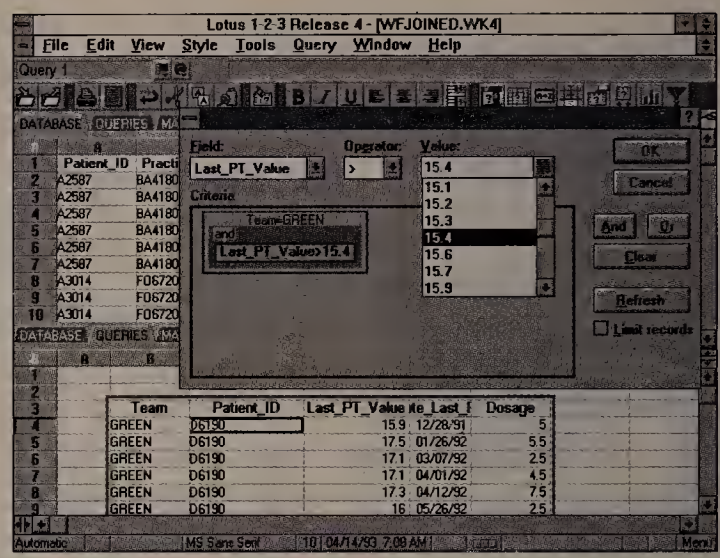
What-If for Work Groups

Version Manager offers features designed to facilitate the sharing of what-if information across a network. To provide an audit trail and make tracking versions easier, it stamps each new version with the author's network, E-mail, or *1-2-3 4.0* ID, plus the date and time of the entry. Version Manager also lets you assign security attributes, such as read-only or hidden, to versions and scenarios.

Version Manager also makes it easy to merge versions or scenarios from different worksheet files, handy when information resides on more than one server. For example, if you're assembling a departmental budget and you need line item estimates from, say, Human Resources and Information Systems, you might distribute a digital worksheet template to the appropriate managers. They could then create different versions on the template using Version Manager. You'd collect their data and use Version Manager's Merge feature to add the new versions to the original file.

A special benefit for users of *Lotus Notes 2.1* or later—save a spreadsheet in the NS4 format, and *Notes* treats the worksheet like a *Notes* database. This means users can concurrently read and write to the file. In addition, *Notes* can notify concurrent users when new versions or scenarios are posted. *Notes* also provides worksheets with its robust security and replication technology, a file updating feature that keeps worksheet versions current across the company.

Version Manager offers the best projection and what-if capabilities we've seen, but its complexity takes getting used to, and we could recommend a few improvements. For example, not being able to edit version or scenario names is inconvenient. But such minor complaints aside, *1-2-3*'s Version Manager is the most potent new spreadsheet tool in a long time.



QUERY OBJECTS give you easy access to many databases.

1-2-3 4.0 for Windows

This time Lotus got it right. The flexible Version Manager, powerful database query tools, new graphics features, and a revamped 3-D interface make this spreadsheet the nexus for your desktop data.

Key Features: Improved Interface • Enhanced charting • 3-D worksheets • Version Manager • Database query tools

Pricing: $495, upgrade $129

Availability: June

Lotus Development Corp., 800/343-5414

Reader service no. 730

Windows 4.0:

It's been more than a year since Microsoft released *Windows 3.1*, and work is well under way on the next version. Windows 4.0 is expected a little more than a year from now.

Although Microsoft would not comment on this unannounced product, industry watchers say that based on what competitors are developing, Windows 4.0 will likely be a 32-bit operating system with improved multitasking, a better interface, and peer-to-peer networking. These features are also expected to appear in various combinations in products from companies such as IBM and Novell, says Andy Patrizio of the *Software Industry Bulletin*. Windows 4.0 will probably require a 386-class or faster PC and 4MB of RAM. (Windows NT is aimed at 486 systems and requires 16MB of RAM).

The 32-bit capabilities could make Windows 4.0 faster than its 16-bit predecessors at running certain graphics-intensive applications such as multimedia, but possibly slower with more mundane programs such as word processors or databases, said Jeff Tarter, editor of *Soft-letter*. Preemptive multitasking will let users run multiple applications and tasks simultaneously with less chance of crashing than with the cooperative multitasking that *Windows 3.1* employs. Preemptive multitasking also will put an end to the screen freezes and jerking and stuttering that can occur when *Windows* runs multiple applications. Multithreading capabilities let an application perform several tasks simultaneously, such as printing and opening files.

According to Jesse Berst, editor and publisher of the *Windows Watcher* newsletter, Windows 4.0 Interface improvements might include an integrated Program Manager and File Manager. You also might find a browser, which would let you view various types of files or search on descriptions of items stored with the file instead of just on basic file attributes. Amy Wohl of Wohl Associates, a computer consulting company based in Bala-Cynwyd, Pennsylvania, says Microsoft might enable longer file names.

Anticipated Windows 4.0 Highlights

- Preemptive multitasking and multithreading
- Integrated 32-bit operating system
- Peer-to-peer networking
- Integrated Program Manager and File Manager
- Document/object browser

Scoping Out the Spreadsheet Contenders

● = Yes ▲ = Unlimited
○ = No

	1-2-3 4.0 for Windows	1-2-3 1.1 for Windows	Excel	Quattro Pro for Windows
Ease of use				
Drag-and-drop copy and move	●	○	●	●[1]
Select and name discontiguous ranges	●[2]	○	●	●
Right-click to change object properties	●	○	●	●
In-cell editing	●	○	○	○
Text wrap within cells	●	○	●	○
OLE client	●	○	●	●
OLE server	●	○	●	○
Analytics				
Automated multiworksheet consolidation	○	○	●	○
Automated what-if version management	●	○	●[3]	○
Statistical functions	54	10	71	10
Math, trig, and engineering functions	68	17	94	19
Financial functions	25	12	50	18
Outliner	○	○	●	○
Presentation				
Free-floating draw objects	●	○	●	●[4]
Edit graph objects on worksheet	●	○	○	○
Graph variables	23	6	▲	▲
User-defined number formats	○	○	●	●
Rotate cell entries	●	○	○	○
Center label in a range	●	●	●	○
Align numbers and formulas	●	○	●	●
Database access				
Relational queries	●	●	●	●
Calculated output fields	●	●	●[5]	●[5]
Dynamic links to external database	●	○	●	●
Direct access to SQL databases	●	●	●	○

[1] Can't drag single cells or insert a dragged range.
[2] Can select but not name a discontiguous range.
[3] Restricts each scenario to single set of values.
[4] Lacks a drawing layer for worksheet annotations.
[5] Excel via Q+E, Quattro via database desktop.

The Database

Ever since the first primitive land creatures discovered *VisiCalc*, the big bugaboo for PC users has been getting numbers from the databases where they're stored and into the spreadsheet without having to retype them. *1-2-3 3.0* introduced the DataLens system for relational querying of remote databases, but that solution has confounded all but the most advanced rocket scientists. The competition offers accessory query programs—*Excel*'s Q+E, for example. *QPW*'s solution, a *Paradox*-style DLL, is pretty much limited to Borland's data base formats.

Enter *1-2-3 4.0 for Windows*. Gone are input, criteria, and output ranges. In their place is the *query object*, which displays the records and fields you've selected. A query object floats on the worksheet like a graph, but you can reference the cells inside it for formulas and calculations.

To create a query, you use an integrated set of dialog boxes to indicate the table or tables you want to query (they can be spreadsheet ranges or external tables accessed through DataLens drivers) and the fields you want from them. A graphical dialog box provides step-by-step support as you build a selection statement. Click OK, and the items selected appear in the query object; whenever you select the object, the main menu displays the Query option to let you modify it. You can name the query and create multiple named queries on the same worksheet. A single query object can join data from separate tables, even if they have different sources, and query objects can display group totals, averages, and so on. As with release 3.*x*, queries can include calculated fields.

The Checkered Flag

1-2-3 4.0 for Windows is an aggressive player in a red-hot spreadsheet market. For the moment, its intuitive interface, glitzy graphics, network-aware Version Manager, and new database metaphor put it ahead of the pack. But look out: In this crowd, nobody sits still for long.

—Richard Scoville and Randy Ross

News Monitor

(continued from page 45)

Terry Denny. Currently, authorities are not sure whether notebook PCs or other devices are creating the interference, Denny says. The interference level also varies from plane to plane; navigational systems on older aircraft are better shielded.

The last FAA study, conducted in 1988, concluded interference risks were minimal. But this February the FAA issued an advisory circular recommending some safety procedures and requesting comment from airlines on problems with electronic devices.

THE DOCTOR IS IN: Vendors are reacting to Compaq's enhanced service-and-support bundle introduced in early spring for PCs sold through its direct division. The Compaq bundle includes one year of on-site service with next-business-day response; two years of carry-in service; and lifetime telephone support all day, every day. AST's response: its Customer Care program for Premmia and Bravo desktops that provides one year of on-site and two years of carry-in service. Customers who bought any AST system in January or later also receive this service. The extended on-site support option is $59 for one year, $99 for two.

NEC responded with a three-year warranty for its Image and PowerMate desktop PCs and extended on-site service at $75 for two years. Customers who bought systems after February 1, 1993, are also eligible.

—Jeff Bertolucci, Laurianne McLaughlin, Randy Ross

In Touch on the Go

TEST DRIVE ▶ A much improved display, a more powerful processor, a swift new communications application from Lotus Development, and the ability to run off-the-shelf DOS software make the Hewlett-Packard 100LX my constant digital companion.

HP execs say the 100LX offers "unconscious portability." In other words, I don't need to hold an internal debate on the pros and cons of lugging a 7-pound modem—what some of you might call a notebook—before scuttling to various meetings and cities. As a frequent traveler, I find a double meaning in HP's notion of unconscious portability, but that's another story. Suffice it to say that taking the 11-ounce 100LX with me soon became a no-brainer.

A proto-PDA (personal digital assistant), the 100LX is great for burst-mode communications. With its PCMCIA 2.0 slot, you can add devices such as a modem. The bundled *cc:Mail Mobile* software is easy to use, and unlike with the clunky *cc:Mail Remote* on my notebook, its interface lets you conduct all your communications and manage your mailbox from one menu bar via drop-down menus and pop-up dialog boxes. In the new interactive mode, you can view your in-box and select only those messages that you want to read and respond to, much as you can in the desktop version of *cc:Mail*.

HP also improved ergonomics and muscle tone in the 100LX. The screen is the same size as the 95LX's, but its CGA display has 16 shades of gray and 25-line-by-80-character resolution. The 3-volt 100LX offers twice the battery life of the 95LX, yet it still requires just two AA batteries, which you can now recharge in the unit.

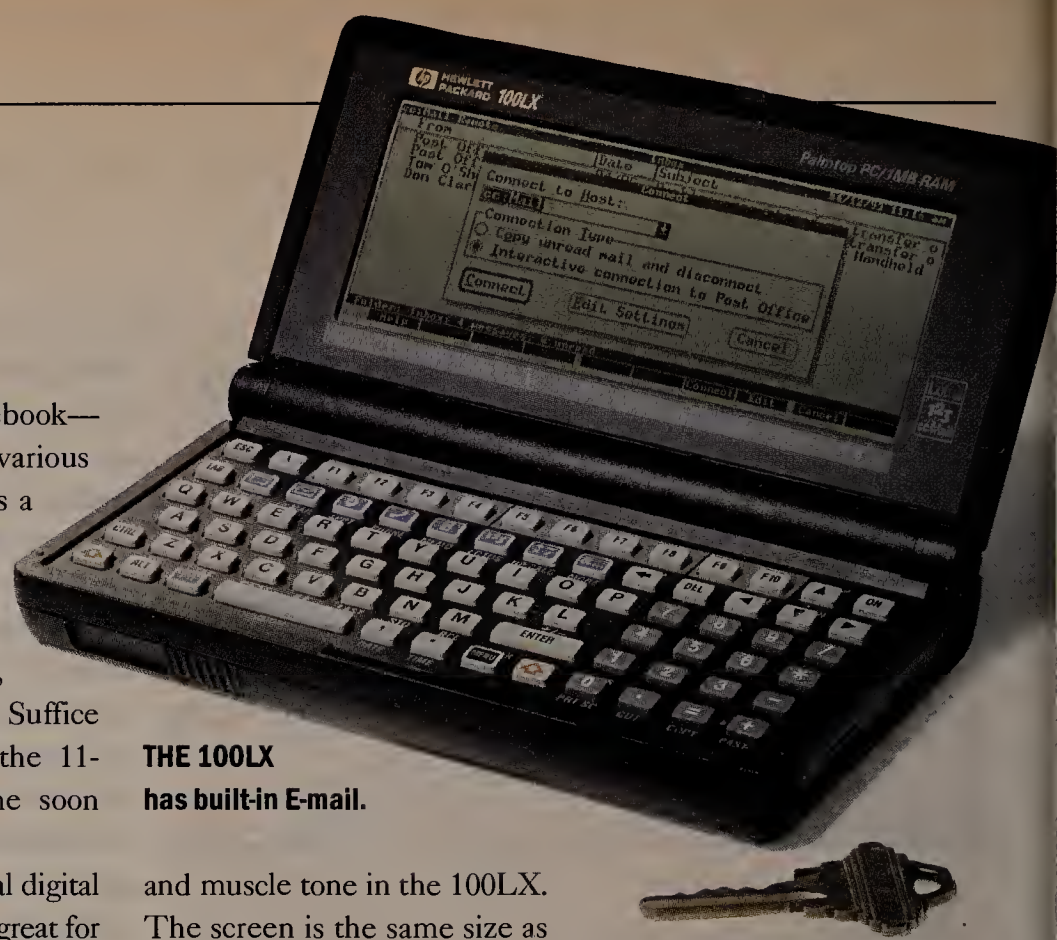
You get one megabyte of RAM and the power of an IBM PC XT with the 100LX; its 7.9-MHz 80C186 is 50 percent faster than the NEC V20 in the 95LX. A 9-pin serial port facilitates external modem and desktop hookups.

You can run DOS apps up to 300K in size, and the PIM applets are much improved over those in the 95LX, thanks to drop-down menus, pop-up dialog boxes, and added functions. The appointment book, for instance, shows your schedule in day, week, and month views. A database offers user-definable fields, as does the phone book. Also new is a note taker, built on database technology so you can do word searches.

Like the 95LX, the 100LX suffers from a lilliputian keyboard, but the layout is improved, and a new color scheme makes keys easier to find.

The 100LX retails for $749, with a street price of $699.

—Russell Glitman



THE 100LX has built-in E-mail.

HP 100LX

This handy bantamweight PC runs DOS applications and includes a version of cc:Mail for on-the-go E-mail.

Key Features: cc:Mail Mobile
- **Runs DOS applications**
- **80C186 processor**
- **CGA screen**

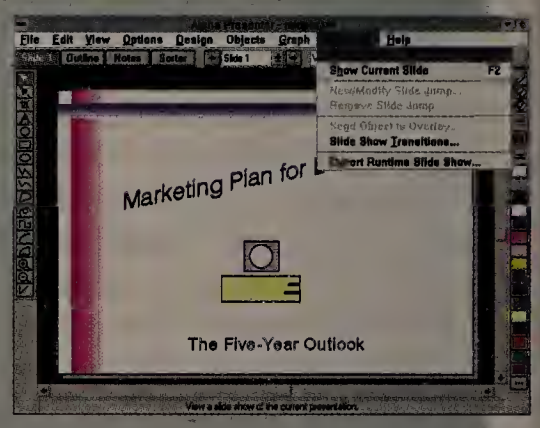
Pricing: $749
Availability: Immediate
Hewlett-Packard, 503/757-2000
Reader service no. 726

Low-Cost Presentation Software:

Alpha Software's $79 *Bravo* offers features comparable to those of leading presentation graphics products that have street prices around $350.

***Bravo* offers several tools to help users work quickly. The package includes an outliner and a sorter to help you develop and organize ideas, a feature to let you print speaker's notes and handouts, and more than 60 design templates so you can create professional-looking presentations rapidly. These ready-made backgrounds are similar to those in *Freelance Graphics'* SmartMasters. *Bravo's* slide-show feature, which is also similar to its *Freelance* counterpart, lets you reorder screens and run your presentation.**

For saving and modifying a presentation over time, *Bravo* allows users to create customized templates, a key feature found also in both *Freelance Graphics* and *Harvard Graphics*. According to Alpha Software's director of business development, Tim Stein, the program enables you to import data from *Windows* spreadsheets such as *Excel*, and you can also update a presentation as your spreadsheet changes using Dynamic Data Exchange (DDE).



Along with the standard text and graphics features, you get a number of extras. You can change *kerning* (the spacing between letters) and condense, slant, and rotate text. *Bravo's* ten drawing tools are comparable to those of its more expensive competitors.

The software supports object linking and embedding (OLE), which means that multimedia fans can add sound or other OLE objects to their presentations. Alpha Software, 617/229-2924.
Reader service no. 727

Get a hold of the best value in LAN power protection

Now just $139!* suggested list price

Blackouts, brownouts, sags... Your data and hardware are vulnerable to problems that surge suppressors and power directors are just not equipped to handle.

Now there's a complete Uninterruptible Power Supply solution to suit any budget. The Back-UPS™ 250 is reliable protection for LAN nodes, 386SX machines, 286, small PS/2 systems, and internetworking hardware such as routers, bridges, gateways and repeaters.

From the largest server to the smallest router, the Back-UPS Series will increase your productivity by providing a cost-effective solution to power problems. Call for your free power protection handbook.

The **Back-UPS 250** offers even more cost-effective protection for LAN nodes (typical runtime for a 386SX system is 10 minutes).

NEW!

Guaranteed ABSOLUTE™ Protection

- ABSOLUTE™ Protection guarantees repair or replacement of equipment (up to $25,000) if damaged by a surge while protected by a properly installed Back-UPS (See warranty for details).
- UL, CSA and Novell approved with a 2 year warranty
- Full-time surge protection and line filtering
- Most models include LAN interface for automatic-shutdown of Novell, LAN Manager, LAN Server, LANtastic, Banyan, SCO Unix, and others
- Ask about PowerChute® UPS monitoring software and Novell compatible UPS monitoring boards
- 230V models available

LAN TIMES READERS CHOICE 1992

Computer Reseller News Editors' Choice

1991, 1990

Model	Application	List	New List
Back-UPS 250	LAN nodes, 386SX, 286, internet hardware, POS	~~$169~~	$139
Back-UPS 400	Desktop 386, 486 systems, 286 servers	~~$249~~	$229
Back-UPS 450	Tower 386, 486 systems, servers	~~$329~~	$279
Back-UPS 600	Heavily configured systems, CAD/CAM workstations	~~$449~~	$399
Back-UPS 900	Multiple systems, longer runtime applications		$599
Back-UPS 1250	Multiple systems, LAN hubs, small minis, telecom equipment		$799

NEW!
NEW!

The Back-UPS™

by American Power Conversion

(800)800-4APC, Dpt. P3

APC 132 Fairgrounds Road, West Kingston, RI (401)789-5735
APC Europe TEL: (+33)1.64.62.59.00 FAX: (+33)1.60.17.80.29

©1992, Back-UPS, PowerChute, Guaranteed ABSOLUTE Protection are trademarks of APC. All other trademarks are property of their respective owners.

ircle 45 on reader service card

HP LaserJet 4L Makes Itself at Home

TEST DRIVE ▶ Life is full of trade-offs. Take low-cost, 300-dpi personal laser printers. If you're looking for an office workhorse with speed and upgradability, you might consider Texas Instruments' $729 MicroWriter or Epson's $799 Action Laser 1000. If you value aesthetics and ease of use over performance, Hewlett-Packard's $849 LaserJet 4L is the better choice. With its sleek design, light weight, and ergonomic enhancements, the HP 4L is stylish and unobtrusive. The trade-off with this great-looking machine? According to the PC World Test Lab, the HP 4L proved one of the slowest, least upgradable lasers in its price range.

When Small Is Beautiful

Aesthetics are a matter of personal preference. For a cramped desk, we like petite. The HP 4L's 14.5-by-14-inch footprint is comparable to the TI's and the Epson's; the real differences lie in height and weight. The LaserJet 4L is just 6.5 inches high and weighs only 15.5 pounds. The Epson is 9 inches high and clocks in at 22 pounds, while the TI weighs 33 pounds.

The HP 4L SAVES YOU MONEY on energy and printing costs.

Besides being sleek, the 4L is convenient. Doors on the side hide connectors for the power cord and printer cable. The front and top are free of buttons, switches, and LCD panels. Four small status lights indicate operations, such as printing in progress, and problems, such as paper jams. The 4L doesn't have an on/off switch. It turns on when you plug it in; powers down after each print job; and starts up when you send it a print job, touch the front panel button, open the top door, or insert paper. Printing when the 4L was powered down produced no noticeable delay.

In today's economy, frugal is also attractive. A draft mode, called EconoMode, conserves toner. HP claims this feature, which yields light but readable output, can cut printing costs in half. Unfortunately, this draft mode doesn't speed printing.

Full Featured, Multitalented

The printer uses HP's Resolution Enhancement Technology and Microfine toner to produce 300-dpi print quality. Resolution enhancement isn't available on the TI and comes only as an option on the Epson. HP also uses a compression algorithm, called Memory Enhancement, to make the printer's standard 1MB of RAM work like 2MB. As a result, HP claims, you won't need more RAM to print full-page 300-dpi graphics, although the 4L supports 2MB.

In addition, the 4L includes HP's PCL 5 and 26 scalable Intellifonts, features neither the TI nor the Epson offers. A BiTronics parallel port provides high-speed and two-way communications. The latter lets you change printer settings and view status messages from your PC. The printer is rated at 8000 pages per month, midway between the Epson's 11,000 pages and the TI's 5000.

The 4L is powered by a 4-page-per-minute Canon engine and a Motorola 68000 processor. Although many personal lasers use the same processor, some, such as the TI and Epson, employ a faster engine. And that appears to make a difference. In PC World Test Lab performance, the HP 4L's average times were 39 percent slower than the Epson's and 21 percent slower than the TI's.

The 4L's limited upgradability is another drawback. Unlike its two competitors, the HP 4L can't be upgraded for PostScript. In addition, you can't expand its 100-sheet capacity by adding a second paper cassette. The single cassette handles A4, executive, letter-, and legal-size paper; a manual-feed slot handles envelopes, labels, and transparencies.

The HP 4L isn't for everybody or for every situation. But if you're looking for style, functionality, and basic laser performance, look no further.

—Randy Ross

HP LaserJet 4L

Basic laser performance in a small, well-tailored package makes this a good choice for high-profile locations and small offices.

Key Features: Low cost • Small footprint • Stylish appearance • PCL 5 and 26 scalable fonts • Power- and toner-conservation features

Pricing: $849

Availability: Immediate

Hewlett-Packard, 800/752-0900

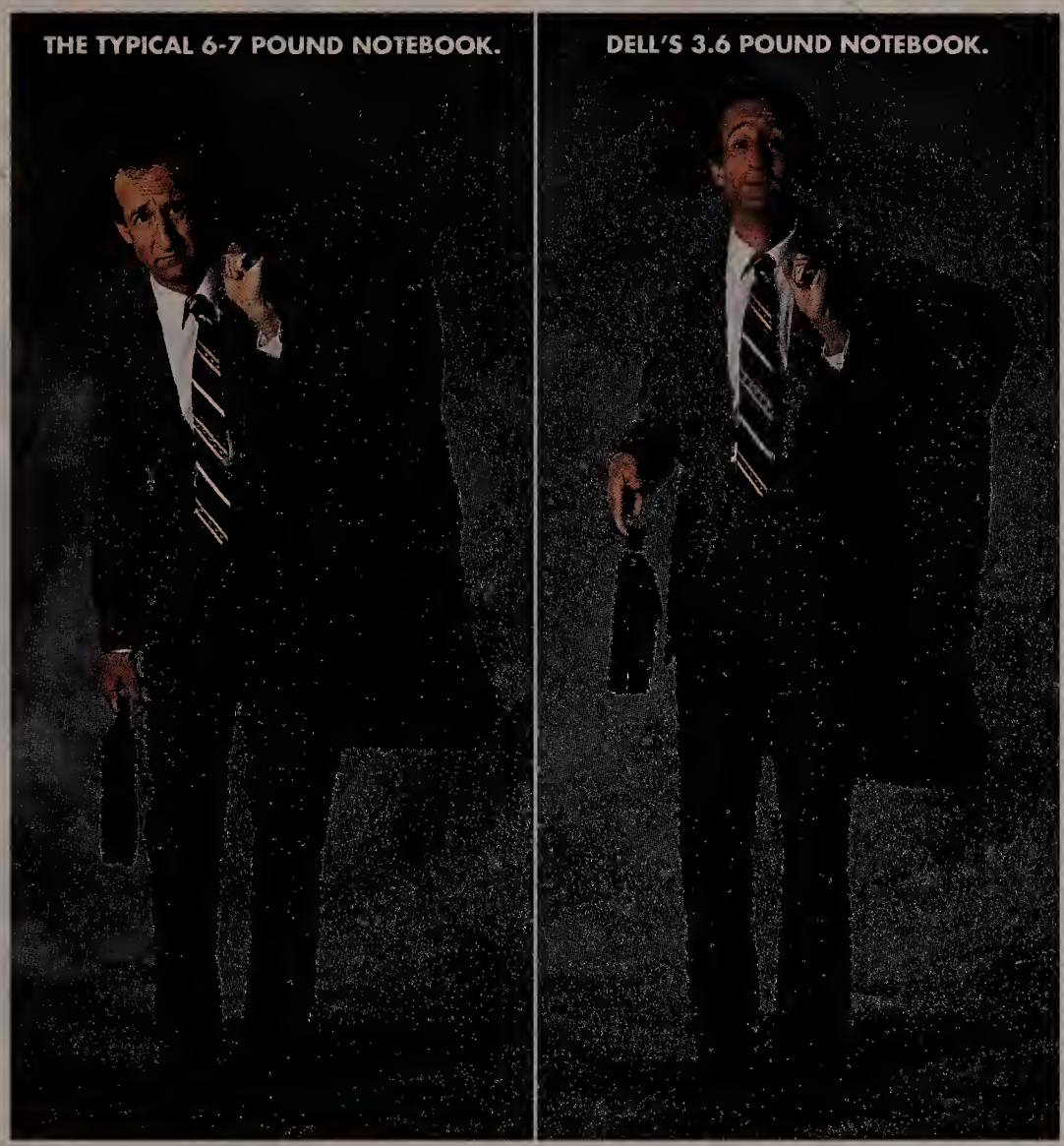
Reader service no. 728

hilean ambassador
ving awareness tha
sador explained th
ness that political i
instability and the

hilean ambassador
ving awareness tha
sador explained th
ness that political i
instability and the

THE PRINT QUALITY OF HP LASERJET 4L OUTPUT, shown at right, is comparable to output from the much pricier HP LaserJet IIIsi.

LOSE UP TO 3 POUNDS OVERNIGHT.



What most people call a notebook, we call obese. The NEW Dell® 325SLi weighs 3.6 lbs. and is a scant 7¾" x 11," and 1¼" thick. Our competitors' notebooks weigh nearly twice as much, and they don't even bother trying to hide it.

The notebook's smaller, not the keyboard. The 325SLi has a full 85-key keyboard with special screen navigation keys, and a built-in keyboard mouse.

$1,499

BUSINESS LEASE*: $55/MONTH

This small number gets you all these big numbers: 25MHz i386™ SL processor, 2MB of RAM, 60MB hard drive, 16KB cache, VGA Reflective (9.5", 640 x 480) LCD, external 3.5" diskette drive, and up to 4 hours of work from the NiMH battery. Not to mention MS-DOS®, Windows, and a mouse. And if you're really hungry for power, we can custom configure a system for you with up to 10MB RAM and 200MB hard drive.

DELL™

800-626-4809

WHEN CALLING, PLEASE REFERENCE **#11DBC**.

HOURS: 7AM-9PM CT MON-FRI, 8AM-4PM CT SAT, 10AM-3PM CT SUN.

IN CANADA,* CALL 800-668-3021. IN MEXICO CITY,* 228-7811.

intel inside®

*Prices valid in U.S. only. Some products and promotions not available in Canada or Mexico. No other discounts apply. *Leasing arranged by Leasing Group, Inc. Intel and the Intel Inside logo are registered trademarks and i386 is a trademark of Intel Corporation. MS-DOS is a registered trademark of Microsoft Corporation. Dell disclaims proprietary interest in the marks and names of others. ©1993 Dell Computer Corporation. All rights reserved.

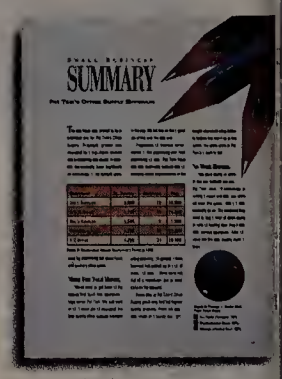
The Way Works Forces Yo

Introducing Claris

All works software claims to be integrated. But just try working with one. You'll find yourself switching back and forth from module to module. Cutting and pasting as you go. It feels anything but integrated.

That's why we designed ClarisWorks™ for Windows to perform like a single application. With word processing, spreadsheet, database and graphics tools all easily at hand. So you can move effortlessly from one set of tools to another. Without jumping from one screen to another.

Stewart Alsop's *P.C. Letter* said "If you want a glimpse of what the future



"Instead of opening separate applications to create a worksheet write a letter, ClarisWorks pu a single document on the scree
PC Computing–*March 1993*

$99* Special Introductory Price. See Your Claris Deale

*In Canada, call 1-800-668-8948 ext 48. Available in Canada for $119 CDN. *Offer valid only until 8/15/93. May not be used with any other special offer.* *©1993 Claris Corporation. All rights reserved. Claris is a regist*

ll Other
oftware
u To Work.

Works for Windows.

olds look no further than ClarisWorks for Windows...the seamlessness with which a user can move from sk to task suggests a new class of 'multifunctional' software."

PC Computing advised "If you're considering an integrated Windows program this is it...all the atures of other integrated packages such as Microsoft Works for Windows...built ound the best and most advanced user interface we've seen in this class of program."

ClarisWorks requires a mere 2MB of RAM and 5MB of hard disk. Call today for demo disk. Or take advantage of our $99 introductory offer. And put e best integrated works software for Windows to work for you.

CLARIS®
Simply powerful software.™

Call 1-800-356-6657, ext. 39. Or Ask For A Free Demo Disk.

lemark and ClarisWorks and ClarisWorks 1.0 Design and Simply powerful software are trademarks of Claris Corporation. All other trademarks or brand names are the property of their respective holders.

MICROSOFT® WINDOWS™ COMPATIBLE

Circle 53 on reader service card

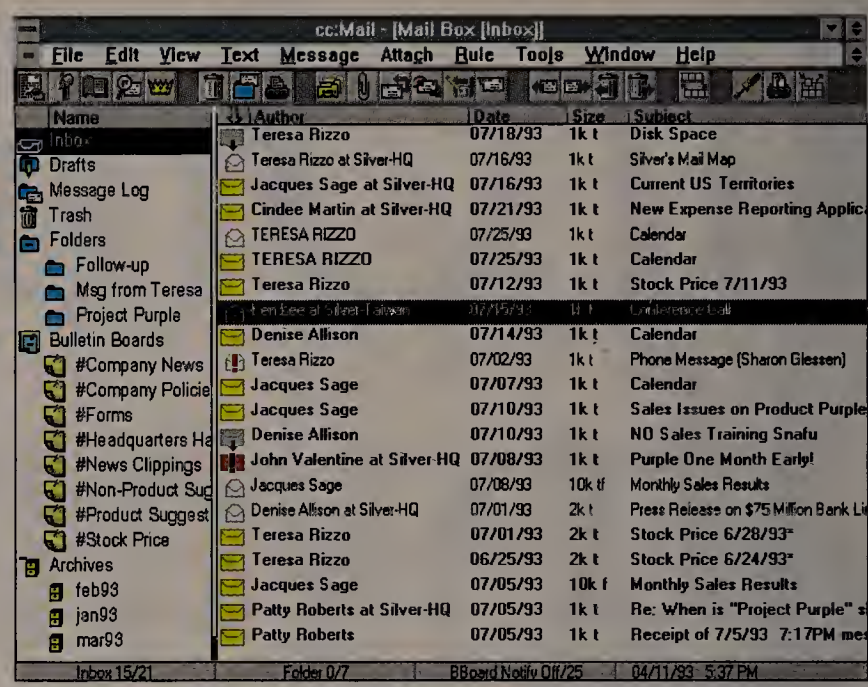
cc:Mail for Windows Plays by Your Rules

Version 2.0 of *cc:Mail for Windows* comes to market with a powerful rules-based messaging feature that can automatically route your electronic mail to other users, store your messages in folders, and perform additional tasks for you. Version 2.0's redesigned interface makes it simpler for you to keep track of your incoming messages, folders, and bulletin board announcements. An improved text editor, a new spelling checker, better search capabilities, and a draft folder make the program easier to use.

Making the Rules

Undoubtedly *cc:Mail*'s greatest improvement is its rules-based processing. Lotus officials claim rules let you automate any *cc:Mail* task that you currently do manually. Before leaving on vacation, you might use rules to forward incoming mail automatically to an assistant and send a form letter to each mail sender informing him or her of your absence. Or you might automatically forward messages that contain certain keywords or text strings to a specific folder—messages containing the string "total expenditures" could go to your budget folder.

Lotus product manager Karl Wong says *cc:Mail for Windows*' rules were designed with average business users in mind. You don't have to learn programming-like commands, and there are no difficult instructions. Instead, you establish rules using *pick lists* of predefined actions that perform tasks based on criteria such as message author or send time. Context-sensitive help is available for each step.



NEW RULES-BASED MESSAGING in cc:Mail for Windows 2.0 lets you automatically route messages to other users and file mail into folders.

Enhanced Interface

Although Lotus wisely avoided making too many drastic changes to the program's appearance, the enhancements are significant, particularly the dual-pane windows, which take a cue from *Windows*' File Manager. A Container List pane on the left shows a collapsible outline of icons for the Inbox, Bulletin Board list, Folders, and so on; the right Contents List pane shows the headings of the items (Messages, Bulletin Boards, and so on) belonging to the item selected in the left pane; and a slider bar enables you to adjust the split between the panes. You can also drag and drop messages between folders and drag files from File Manager to attach them to outgoing messages.

CC:MAIL FOR WINDOWS' ENHANCED INTERFACE makes it easier to point-and-click your way between in-box, folders, and bulletin boards.

The draft and trash folders, which were first featured in *cc:Mail for DOS 4.0*, appear in the *Windows* version as well. The draft folder allows you to save a message as a draft document and revise it later, while the trash folder enables you to undelete any messages you erased by accident and control how long *cc:Mail for Windows* stores deleted messages.

Easier Editing

You'll also notice an improved text editor in version 2.0—a change that *cc:Mail for Windows 1.1* users will welcome. A new spelling checker, based on the 190,000-word Houghton Mifflin dictionary (the same found in other Lotus products), cuts down on misspelled memos. You can now import and export text directly from files without having to use the *Windows* Clipboard. And advanced search-and-replace capabilities allow you to retrieve messages from your mail folders and directories.

cc:Mail for Windows 2.0 retains the pricing of the previous version. The server-based Platform Pack lists for $495. *cc:Mail for Windows 2.0* User Packs cost $345 for 10 users, $845 for 25 users, and $3295 for 100 users.

--Jeff Bertolucci

cc:Mail for Windows 2.0

Powerful new features of this popular E-mail program include rules-based mail and an enhanced interface.
Pricing: $345 to $3295, plus $495 for server pack
Availability: Immediate
Lotus Development Corp., 415/961-8800, 415/961-8400 (fax)
Reader service no. 729

We just removed the one thing that kept you from buying a high quality color printer.

$995.00

Introducing the

Primera™

COLOR PRINTER

Finally – great color that's *affordable.*

New from FARGO,® the Primera Color Printer delivers rich, vibrant color for stunning presentation graphics and transparencies. All in just over two minutes per page! But at just $995,* it's thousands of dollars less than other high quality color printers. So if you're shopping for a color printer but don't want to spend all that money, check out the new Primera Color Printer. It'll make you look as brilliant as your presentations.

- Up to four times faster than ink jet printers
- Microsoft® Windows™ 3.1 driver included
- Thermal transfer print quality
- Monochrome ribbon available for near-laser quality text-only printing

Circle 100 on reader service card

PC Computing MVP 92 FINALIST

For more information, call

FARGO
ELECTRONICS, INCORPORATED
7901 Flying Cloud Drive
Eden Prairie, MN 55344 U.S.A.

1-800-FARGO-22
Ext. 700
(1-800-327-4622) 612-941-9470
FAX: 612-941-7836

Primera is a trademark and FARGO is a registered trademark of FARGO Electronics, Incorporated. Microsoft is a registered trademark and Windows is a trademark of Microsoft Corporation. © 1992 FARGO Electronics, Incorporated. All rights reserved. *Suggested U.S. Retail Price.

How to Survive If Your PC Maker Doesn't

When Sam Watts bought his 486 Windows Power Station PC from Compu-Sys, a direct vendor based in Irwindale, California, he thought he got a good deal. "It looked like the best bang for the buck," Watts says. But when his system arrived, it lacked the $265 fax-modem he had ordered, as well as proper documentation and the correct monitor cable. Watt called Compu-Sys two days later but "got no one," he says. After several days of calling, Watts finally reached a recording that said Compu-Sys was out of business.

Since Watts's credit card payment had already cleared, he was out $265. As if that wasn't enough, he had to drive 45 miles from his home in Branson, Missouri, to a computer repair shop in Springfield and spend $100 to get his new computer in working order.

Buying Smart in Tough Times

Watts's hard-luck story isn't unique. An increasing number of PC buyers are finding that their vendors have suddenly closed shop. As major companies like AST, Compaq, Dell, and IBM continue to slash prices and add features to their low-end lines, smaller vendors, unable to survive on ever-shrinking profit margins, bite the dust. Recent casualties include LodeStar Computers of City of Industry, California, and FastMicro of Phoenix, Arizona.

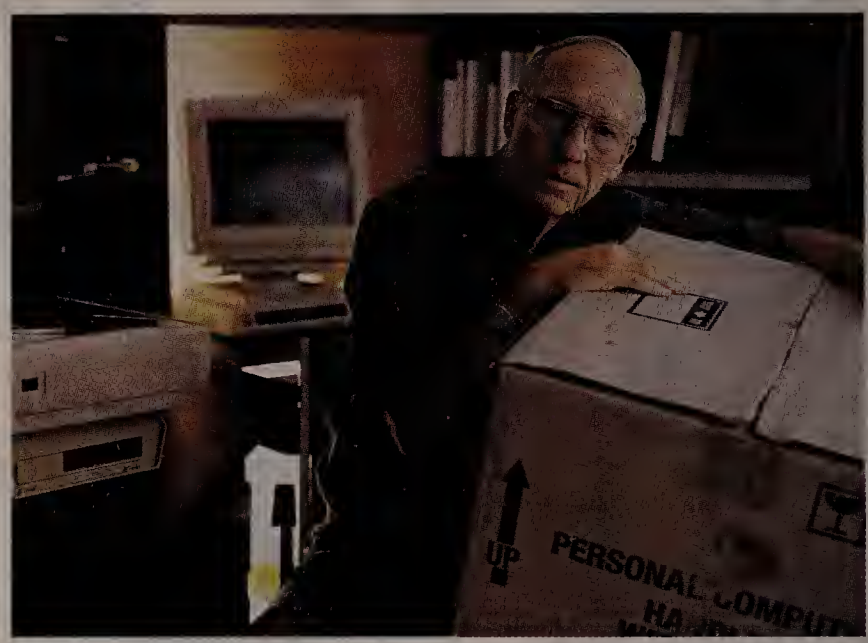
Hugo Huapaya of Miami Springs, Florida, bought a 50-MHz 486DX system from LodeStar Computers in December 1992. When his system arrived in January, Huapaya noticed a number of things wrong with it. The system booted slowly, and neither the local bus design nor the mouse driver was what he had ordered.

Huapaya shipped his system back to LodeStar. "About three weeks later I got the system back with a note saying [LodeStar] had moved," Huapaya says. Now he has a computer he doesn't want, and his vendor is out of business.

Wisely, Huapaya had paid by credit card and immediately disputed the LodeStar charge, so he hasn't had to pay for the system. However, the disputed amount is still on his credit card statement, and Huapaya says it will take "a few more months" to clear the charge.

Know Thy Vendor

What's a savvy buyer to do? Use common sense, says Jennifer Crowl, spokesperson for the Direct Marketing Association in New York. To check a vendor's reputation for honesty and professionalism, Crowl recommends calling the Better Business Bureau in the city where the vendor is based. Ask if any complaints have been filed against the company, she says. And if you've never heard of the vendor, ask your colleagues and associates whether they've done business with the firm.



BUYER BEWARE: Sam Watts received his 486 PC without the fax-modem he ordered; when he called his vendor, it had closed shop.

The smart buyer also investigates how long the vendor has been in business, says Robert Zises, president of the National Computer Exchange in New York. He also recommends running a financial check on the company and calling the Consumer Affairs Department in the vendor's home state.

More tips from Zises: Get everything in writing, and always know the terms of your transaction. Take time to check out new equipment thoroughly, and ensure that the components and the configuration you receive are exactly what you ordered.

You may also want to sign a contract with a third-party service provider. Although most vendors provide at least one year of service with their systems (usually through an outside vendor), these contracts usually are void if the system vendor goes out of business.

—Jeff Bertolucci

Buying During a Shakeout: Smart Tips for Savvy Shoppers

1. Check the Better Business Bureau in the vendor's city as well as the state Consumer Affairs Department to determine if complaints have been filed against the company.
2. Ask colleagues and business associates if they've done business with the company.
3. Get written confirmation from the vendor about pricing, warranty, and return policy.
4. Verify availability of merchandise and ship dates.
5. Don't pay cash. Use a credit card.
6. When your equipment arrives, make sure the configuration and components are what you ordered.
7. If the equipment is defective, keep a written diary of its problems and the steps you've taken to correct them (including phone calls to the vendor and return ship dates).
8. Before you return defective equipment, get a return merchandise authorization from the vendor.
9. Sign a service contract with a third-party service provider.

PULL HERE

Don't Open Until 1994

To: PC Buyers

From: Your friends at Gateway 2000

More Reasons To Go Hog-Wild Durin

Need a reason to celebrate? We're making this the best summer ever to buy a Gateway PC! During our 486 Fest, you'll find better-than-ever buys on all the fabulous systems in our product line. You'll think you died and went to hog heaven! Buy some fiesta goodies, invite a few party animals over and call us. We'll give you lots of reasons to party!

Party Reason — *Choosing a 486 system shows you're a smart buyer!*

A less astute buyer might go for a 386 or Pentium™ system, but you know where the real value is. Gateway 2000's desktop and Nomad PCs are now all 486 systems for good reason. With our great prices on 486 technology, 386 systems are no longer a smart buy. And first-generation Pentium systems are not a good value.

Even if you were willing to pay the steep premium other manufacturers are charging for Pentium systems, you'd have trouble getting one because availability is extremely limited. Our engineers say the Pentium systems in our lab run so hot, you could use one to heat a hog barn. Besides, Pentium systems on the market today will be outperformed quickly by improvements in Pentium technology. That's why we're not selling Pentium systems yet. At Gateway, we won't sell anything unless it's a good value for you.

In today's market a 486 machine is the way to go, especially now that all of our desktop ISA systems are Pentium technology ready and guaranteed to be upgradeable.

Party Reason — *If you pick a mini desktop, you'll save enough to invite the whole barnyard to your party.*

Gateway's mini-desktop systems — 4SX-25, 4SX-33 and 4DX-33 — are petite but powerful, based on an integrated design that incorporates many subsystems on the motherboard for the best price-performance ratio. All mini desktop systems include: 4 to 8MB RAM; a large and fast hard drive, operating on the local bus for even faster drive performance; a fast video chipset with 1MB; a brilliant, crisp display from the standard 14-inch CrystalScan™ non-interlaced, .28mm dot pitch color monitor; and more available expansion slots than you find in most small-footprint PCs. The combination of these features makes a cool Windows™

uteway's 486 Fest!

machine for an unbeatable price. Now that's cause for celebration!

Party Reason — *You'll be wallowing in ecstasy if you buy a local bus system.*

Go ahead and splurge on our 4DX2-50V or 4DX2-66V models. We put ATI's™ Graphics Ultra Pro video card with 1MB VRAM on our VESA® local bus for results that will be the hit of your party.

Gateway 2000

486 Fest

Plus, these systems have a hefty 8 or 16MB RAM with cache, and party-hearty hard drives running on the local bus. You get an extra VESA local bus expansion slot, a 15-inch flat, square CrystalScan color monitor, and more free choices of application software than you'll find anywhere else.

Party Reason — *You'll get the CD-ROM drive you always wanted.*

It's included with our 4DX2-66 systems! Or you can upgrade any other standard configuration with a CD-ROM. We supply a free system CD when you purchase a PC with a CD-ROM drive. The CD includes Microsoft's® Multimedia Pack,™ designed to let you explore the value of multimedia technology. You get an interactive user's guide to Windows and a collection of sound, animation and video clips to use in business presentations and documents.

Party Reason— *You can have it your way at Gateway.*

We custom build each Gateway 2000 computer to your order. We'll gladly provide you with a quote on a special configuration. Call our sales department!

Party Reason — *You'll save money!*

Check the configurations and prices on the back page of this ad. We've gone hog-wild for 486 Fest!

Party Reason — *The wrappings!*

Your Gateway system comes in a black-and-white cow-spotted box. Some people use our boxes for end tables and playroom furniture. It will certainly be a conversation-starter at your party.

Party Reason — *Get our 486 Fest Best Buy!*

Check the back page of this ad for an unbelievably good buy on a smart 4DX2-66 local bus system configuration including 8MB RAM, 340MB hard drive and CD-ROM for only **$2495!**

The Gateway 2000 4DX2-50V at $2295 is a favorite with our three little pigs.

GATEWAY2000

800-846-2065

Party On With Value-Priced Portabl

Keep counting the reasons to celebrate during Gateway's 486 Fest! You'll find plenty when you look at our Nomad notebook PCs and computer peripherals!

Nomad Notebooks

Party Reason — *You'll get 486 desktop performance in a lightweight portable when you buy a Nomad.*

Why settle for a 386 notebook when you can get a powerful 486 Nomad in the same price range? All three Gateway 2000 Nomad models are 486 systems with snappy performance that's still rare in notebooks. Plus, they're smaller than many notebooks, weighing just 5.6 pounds and measuring 8.5" x 11" x 1.8". No other notebook this size can beat the Nomad 450DXL's combination of performance and battery life! In *PC Magazine's* Battery Rundown Test, Nomad systems operated up to six hours on a single battery with power management enabled.

Party Reason — *No more squinting at a dim and fuzzy display!*

Nomad screens are big and brilliant — a full 10" VGA backlit display with 64 gray scale. You can use your Nomad in all lighting conditions.

Party Reason — *Three cheers for a great keyboard and mouse!*

Nice feel! The 79-key touch-type keyboard is comfortable, quiet and fast. Nomad 450DXL models now also include Microsoft's® Ballpoint™ portable mouse with Quickport,™ standard.

We have lots of options for our Nomads, too. Call for details!

Peripherals

Party Reason — *You'll save money on connectivity tools!*

TelePath™ Fax/Modem. It's everything you ever wanted in an internal fax/modem, including a great price! The Gateway 2000 TelePath is a 14,400bps modem, V.32bis, with 9,600bps fax capability. It's compatible with the standard AT command set and is downwardly compatible with lower modem speeds. Package includes software — WinFax Pro,® Crosstalk™ for Windows and Qmodem — plus a free CompuServe® trial membership. **$195**

Network Cards. Call for a selection of Ethernet cards and Token Ring adapters, installed and configured.

Microsoft Windows™ for WorkGroups. Networking made easy! Share files and printers, send electronic mail, schedule group meetings with the click of your mouse — and get everything you need in one inexpensive package. That's the beauty of Windows for Workgroups. Even a beginner can set up and configure a network with this fantastic product. Price includes an Ethernet adapter and software. Hardware and software are factory-installed. **$159**

Party Reason — *You'll save money on multimedia software and peripherals!*

CD-ROM Kit. You'll enter a whole new world of possibilities with your PC when you add a CD-ROM drive, giving you access to exciting new applications, databases and entertainment programs. With applications continually getting bigger, wouldn't it be convenient to get software on a single CD rather than piles of floppy disks?

Get galloping portability on your road trips with Gateway's top-of-the-line Nomad 450DXL.

nd Peripherals!

Comparable CD-ROM drives usually retail for over $400. Manufactured specially for Gateway 2000, this kit includes CD-ROM, interface card and everything you need to add MPC-compliant CD-ROM to your PC. **$225**

Microsoft Windows Sound System.™ Here's the sound system designed for business, complete with a headset for private office use. You can "speak" commands to your PC for hands-free operation. Let your PC read numbers back to you for proofing spreadsheets. Embed audio messages in Windows OLE applications. Add audio to screen savers. Play your Ad Lib® and Sound Blaster™ games — and more! Our special Gateway price includes soundboard, microphone, headset and software. **$149**

Party Reason — *You'll save money on all kinds of extras from Gateway!*

Colorado Memory Systems™ TBU. 250MB internal automatic tape backup unit copies up to 9.5MB per minute with high-speed data compression. Reads previously formatted Archive™ tapes, too. Comes with easy-to-use DOS software, one tape and cable. 486 Fest price: **$195**!

CrystalScan™ 15-Inch Monitor. Non-interlaced color monitor with flat, square screen. If the system you want is advertised with a 14-inch monitor, you can upgrade at the time of purchase to a 15-inch monitor for only **$100**.

Panasonic® KXP2123 Color-Capable Printer. Add color to your documents with this 24-pin dot matrix printer. Includes Adobe Type Manager.® Call for 486 Fest price!

Texas Instruments® MicroLaser™ Plus Laser Printer. Never before has such a small, Postscript® laser printer offered so much speed and economy. The MicroLaser Plus is only 13.4" x 14.2", yet it prints 9 pages per minute at 300dpi. Call for 486 Fest price!

Gateway 2000

486 Fest

We offer many other system options and upgrades, including 17" and 20" monitors, tape backup units, bigger hard drives, other software and more! Call today!

The software and peripherals listed here are sold only with the purchase of a system. For details on our complete line of extras for Gateway customers, ask for our special add-on components division when you call.

GATEWAY2000

800-846-2065

Celebrate! We Give You More Softwar

That's right! We have even more reasons to party during Gateway's 486 Fest! We offer more free choices of application software with our systems than any other manufacturer. Plus, all software is pre-installed and ready to run the moment your system arrives. Hooray! No installation hassles!

With Nomad, mini desktop and our 4DX2-66 Best Buy systems, you get Works, one of the best integrated software packages on the market.

Party Reason — *Microsoft Works for Windows.*™

Works for Windows is the single program that combines all the tools you need to run a business: word processor, spreadsheet, database and electronic communications. It's simple to use yet provides power and functionality for advanced users.

With desktop and tower systems that include "choice of application software," you can select one of the following software packages. All applications are the latest versions.

Party Reason — *Microsoft Excel for Windows.*™

Microsoft Excel gives you unprecedented power and analytical functions, outstanding reporting and presentation tools, and easy charting. Includes faster ways to work. Reviewers consistently choose Excel as the best spreadsheet for Windows. It's an *InfoWorld* Product of the Year!

Party Reason — *Microsoft Word for Windows.*™

The original word-processing application for Windows is still the best selling! Drag and drop text and graphics around the page for easy creation of professional-looking documents. Existing WordPerfect® files (and other file formats) are usable in Word. You can even type a WordPerfect command and see Word's equivalent command automatically demonstrated on-screen!

Party Reason — *Microsoft Word and Bookshelf 92,® CD-ROM Edition.*

The most popular word processor for Windows now becomes the ultimate writing tool with an entire electronic reference library full of multimedia sights and sounds! Includes dictionary, encyclopedia, thesaurus, atlas, quotations, and more.

Party Reason — *Microsoft PowerPoint for Windows.*™

For easy, professional on-screen slide shows, overhead transparencies or 35mm slide presentations. Fast and flexible word processing, graphing, outlining and drawing tools give you more time to master your content instead of wrestling with your software.

hoices To Crow About!

Party Reason — *Microsoft Project for Windows.*™

Project management is easier and more flexible than ever! This program gives you the power and versatility to manage your schedules and resources more efficiently. That's why *PC Magazine*, *PC Week*, *PC World* and *Software Digest* call Project the best program in its category!

Party Reason — *The MS Entrepreneur Pack.*

Four great software packages in one! Microsoft Works,™ Publisher,™ Money™ and an Entertainment Pack.

Party Reason — *Borland Paradox® for Windows.*

Paradox for Windows is the relational database that makes a powerful database easy to use. Now you have complete access to data, plus all the tools you need to create graphical applications in no time. Paradox for Windows works with existing Paradox for DOS and dBASE files without modification.

Party Reason — *The Windows Programmer Pack.*

Get everything you need to create programs for Windows: Microsoft QuickC for Windows,™ Visual Basic for Windows,™ Windows Control Development Kit,™ Windows Help Compiler™ and Windows Programmer's On-Line Reference.™

Party Reason — *Upgrade to the CD-ROM Edition of Microsoft Office.*™

You can upgrade from a choice of application software to Microsoft Office, CD-ROM version, for only $99! This single package has all the leading Windows applications: Word, Excel and PowerPoint. The standard edition of MS Office is also available as an upgrade from a choice of application software for $175, or $499 as a second application.

Party Reason — *Upgrade from Works to choice of application.*

If the system you want comes with MS Works for Windows, you can upgrade to a choice of application software for only $100.

Software shown here is sold only with the purchase of a system. Software sold with systems includes the identical applications contained in retail packages but will not include the retail box. You get all master diskettes and manuals, shrink-wrapped and packaged in a Gateway 2000 box.

intel inside

Everyone's flocking to check out the life of the party, Gateway's 4DX2-66 Best Buy system shown with optional Labtec speakers.

GATEWAY2000

800-846-2065

The Whole Herd Is Dedicated To Pro

Yes, this is the whole gang at Gateway 2000. We now number in excess of 2,000 people. We gathered everyone together for this 486 Fest kick-off photo so you could see all the friends you have in the business, and so we could renew our commitment to your complete satisfaction.

Despite some blustery weather, Ted, our president and founder, gave us an inspiring pep talk about customer satisfaction and value. He reminded us that we will be the best in this industry only as long as we remember the guiding principles of our company, best described in our mission statement:

We are Gateway 2000.
We care about and respect you, our customers.
We pledge to you that we will be honest, courteous and friendly.
If we make a mistake, we will admit it.
If you're unhappy about something, we'll do everything in our power to make it right.
We'll treat you as an individual and take special care to see that your individual situation is handled fairly.
We have fun working together, striving to be the most knowledgeable, productive and successful team in the world.
We blend our talents to continually offer higher quality, more innovative and useful products, at a value unmatched by competitors.
We will always be happy but we will never be satisfied.
And we will continually improve everything we do.
We will succeed, together as a team.
We are Gateway 2000.
We are the only logical choice!

Gateway 2000
486 Fest

ng You With The Best Service!

Party Reason — *You'll like doing business with people who care about you!*

Each and every person in this photo rededicated his or her efforts to achieving these goals. Like a married couple going through a second wedding ceremony after many years of marriage, our energies were refocused on what's important. And what's important to us is *you*!

Party Reason — *You get excellent after-the-sale support!*

Every Gateway 2000 system comes with a **30-day money-back guarantee**. If you don't like your system, send it back within 30 days for a refund. All systems come with a **one-year limited warranty** and telephone **technical support** for the life of the system from our award-winning tech department. You also get an **automated fax service** to supply you with detailed documentation on over 150 technical subjects, and a **lifetime BBS membership** for additional technical support and online forums.

We offer **on-site service** to most locations in the country (factory service only for notebooks). **Replacement parts** leave our factory as quickly as possible; we pay overnight shipping. Plus we now have **interactive documentation** on desktop systems with pictures and text right on your hard drive (in addition to comprehensive hardware and software manuals).

Party Reason — *It's so easy! Just give us a call!*

We make it easy for you to buy a Gateway PC, with convenient payment options including major credit cards and C.O.D. terms. Net 30-day terms and leasing options are also available to qualified commercial customers.

For a truly celebrated value, the choice is black-and-white: Gateway's 4DX-33.

intel inside

1993 BYTE READERS' CHOICE AWARD

PC WORLD SERVICE EXCELLENCE AWARD

SERVICE RELIABILITY PC MAGAZINE READERS' CHOICE

GATEWAY2000

800-846-2065

Gateway 2000's Party List

4SX-25

- 25MHz 486SX Intel® Processor
- 4MB RAM
- 3.5" Diskette Drive
- 80MB 17ms IDE Hard Drive
- Local Bus IDE Interface
- **Intel Pentium™ Technology Ready**
- Windows Accelerated Video w/1MB DRAM
- 14" Color CrystalScan™ 1024NI
- Mini Desktop Case
- 5 16-Bit ISA Slots
- 124-Key AnyKey™ Keyboard
- MS-DOS® 6, Diags, Windows™ & Mouse
- MS Works for Windows™ 2.0

$1295

4SX-33

- 33MHz 486SX Intel Processor
- 4MB RAM
- 5.25" & 3.5" Diskette Drives
- 170MB 13ms IDE Hard Drive
- Local Bus IDE Interface
- **Intel Pentium Technology Ready**
- Windows Accelerated Video w/ 1MB DRAM
- 14" Color CrystalScan 1024NI
- Mini Desktop Case
- 5 16-Bit ISA Slots
- 124-Key AnyKey Keyboard
- MS-DOS 6, Diags, Windows & Mouse
- MS Works for Windows 2.0

$1495

4DX-33

- 33MHz 486DX Intel Processor
- 8MB RAM, 64K Cache
- 5.25" & 3.5" Diskette Drives
- 212MB 13ms IDE Hard Drive
- Local Bus IDE Interface
- **Intel Pentium Technology Ready**
- Windows Accelerated Video w/ 1MB DRAM
- 14" Color CrystalScan 1024NI
- Mini Desktop Case
- 5 16-Bit ISA Slots
- 124-Key AnyKey Keyboard
- MS-DOS 6, Diags, Windows & Mouse
- MS Works for Windows 2.0

$1895

4DX2-50V

- 50MHz 486DX2 Intel Processor
- 8MB RAM, 64K Cache
- 5.25" & 3.5" Diskette Drives
- 212MB 13ms IDE Hard Drive
- Local Bus IDE Interface
- **Intel Pentium Technology Ready**
- ATI™ Ultra Pro Video w/1MB VRAM on VL-Bus™
- 15" Color CrystalScan 1572FS
- Desktop Case (Tower Upgrade)
- 7 16-Bit ISA Slots, 2 on VL-Bus
- 124-Key AnyKey Keyboard
- MS-DOS 6, Diags, Windows & Mouse
- Choice of Application Software

$2295

4DX2-66 BEST BUY

- 66MHz 486DX2 Intel Processor
- 8MB RAM, 64K Cache
- 3.5" Diskette Drive
- CD-ROM Drive
- 340MB 13ms IDE Hard Drive
- Local Bus IDE Interface
- **Intel Pentium Technology Ready**
- Windows Accelerator w/1MB DRAM on VL-Bus
- 14" Color CrystalScan 1024NI
- Desktop Case (Tower Upgrade)
- 7 16-Bit ISA Slots, 2 on VL-Bus
- 124-Key AnyKey Keyboard
- MS-DOS 6, Diags, Windows & Mouse
- MS Multimedia Works, CD-ROM Edition

$2495

4DX2-66V

- 66MHz 486DX2 Intel Processor
- 16MB RAM, 256K Cache
- 3.5" Diskette Drive
- CD-ROM Drive
- 340MB 13ms IDE Hard Drive
- Local Bus IDE Interface
- **Intel Pentium Technology Ready**
- ATI Ultra Pro Video w/1MB VRAM on VL-Bus
- 15" Color CrystalScan 1572FS
- Desktop Case (Tower Upgrade)
- 7 16-Bit ISA Slots, 2 on VL-Bus
- 124-Key AnyKey Keyboard
- MS-DOS 6, Diags, Windows & Mouse
- Choice of Application Software

$2995

PC Computing MVP WINNER

PC MAGAZINE EDITORS' CHOICE

1993 BYTE READERS CHOICE AWARD

4DX2-66E

- 66MHz 486DX2 Intel Processor
- 8MB RAM, 256K Cache
- 5.25" & 3.5" Diskette Drives
- 500MB 11ms SCSI Hard Drive
- 32-Bit EISA SCSI Controller
- Windows Accelerated Video w/ 1MB DRAM
- 14" Color CrystalScan 1024NI
- Tower Case
- 8 32-Bit EISA Slots
- 124-Key AnyKey Keyboard
- MS-DOS 6, Diags, Windows & Mouse
- Choice of Application Software

$3495

NOMAD 425SXL

- 25MHz 486SX Intel Processor
- 4MB RAM
- 3.5" Diskette Drive
- 120MB IDE Hard Drive
- Backlit 10" VGA Screen, 64 Gray Scale
- Simultaneous Video with 1MB
- Size 8.5" x 11" x 1.8," 5.6 Lbs.
- 6-Hr. NiCad Battery & AC Pack
- 1 Parallel / 1 Serial Port
- 79-Key Keyboard & FieldMouse™
- MS-DOS and Windows
- MS Works for Windows

$1995

NOMAD 450DXL

- 50MHz 486DX2 Intel Processor
- 3.5" Diskette Drive
- Backlit 10" VGA Screen, 64 Gray Scale
- Simultaneous Video with 1MB
- Size 8.5" x 11" x 1.8," 5.6 Lbs.
- 6-Hr. NiCad Battery & AC Pack
- 1 Parallel / 1 Serial Port
- 79-Key Keyboard & MS Ballpoint
- MS-DOS, Windows & Works for Windows

$2495
(With 4MB RAM and 120MB Hard Drive)

$2995
(With 8MB RAM and 200MB Hard Drive)

Printed on recycled paper with soy inks

Accent on the finest... Caviar WESTERN DIGITAL

MICROSOFT® WINDOWS™ READY-TO-RUN

intel inside®

GLOBAL RECLEAF

GATEWAY2000
"You've got a friend in the business."®

800-846-2065

610 Gateway Drive • P.O.Box 2000 • North Sioux City, SD 57049-2000 • 605-232-2000 • Fax 605-232-2023
Sales Hours: 7am-10pm Weekdays, 9am-4pm Saturdays (CT)

All hard drive sizes are manufacturer's specified capacities. Microsoft MS-DOS 6 can increase hard drive capacity through software compression.

©1993 Gateway 2000, Inc. AnyKey, black-and-white spot design, "G" logo and "You've got a friend in the business" slogan are registered trademarks, and CrystalScan and TelePath are trademarks of Gateway 2000, Inc. The Intel Inside Logo, Intel, Pentium and OverDrive are trademarks or registered trademarks of Intel Corporation. All other brands and product names are trademarks or registered trademarks of their respective companies. Prices and configurations are subject to change without notice. Prices do not include shipping.

Contenda and WinBook Notes: Powerful, Affordable Lightweights

The ideal mobile computer would require no compromises: It would be lightweight and reasonably priced without sacrificing CPU power, screen brightness, and a comfortable keyboard. Today it's hard not to make a few compromises, but two new lightweights from Zeos Int'l and Micro Electronics strike an attractive balance—at prices that tip the scales in their favor.

The $1495 Zeos Contenda is a 3.9-pound subnotebook, but don't let its weight fool you. This 9.7-by-6.1-by-1.8-inch machine is sleek and powerful. The product beats competing subnotebooks, namely the Gateway 2000 HandBook and the pricier Dell 320SLi, in two key areas: CPU power and display. The Contenda's power-saving Intel 25-MHz 386SL processor is more powerful than the HandBook's Chips and Technologies 286-class processor and the 320SLi's Intel 20-MHz 386SL chip. Its 7½-inch, 64-gray-scale LCD screen is the only backlit VGA display of the three. So it's brighter and easier to read, particularly in low-light situations.

Big Enough to Type

Can you type on it? Yes. The 80-key keyboard has a solid feel, with alphanumeric keys that are slightly, but not noticeably, smaller than the keys on your desktop system and offer a full 3mm key travel. To save space, Zeos reduced the size of the <Shift>, <Enter>, and function keys, but this keyboard should be adequate for all but the largest hands. The only compromise is the use of a horizontal cursor key arrangement instead of the standard inverted T. The trackball, though minuscule, proved quite usable.

The Contenda has a nickel–metal-hydride battery that will power the system for up to 4 hours, according to the vendor, although some of our staff complained that it ran only 1½ hours in real use. The system's standard configuration includes 2MB of RAM upgradable to 10MB, and an 80MB hard drive. It also has an unusually small, light AC adapter. The Contenda can take an internal fax-modem and connections for an external floppy drive and a VGA monitor. It also has one serial and one parallel port.

A Winning NoteBook

The Micro Electronics WinBook has achieved a new balance in weight and performance and should be of particular interest to *Windows* users. At only 5.4 pounds, the WinBook is billed as a notebook, but it makes its peers look like candidates for a weight-loss program.

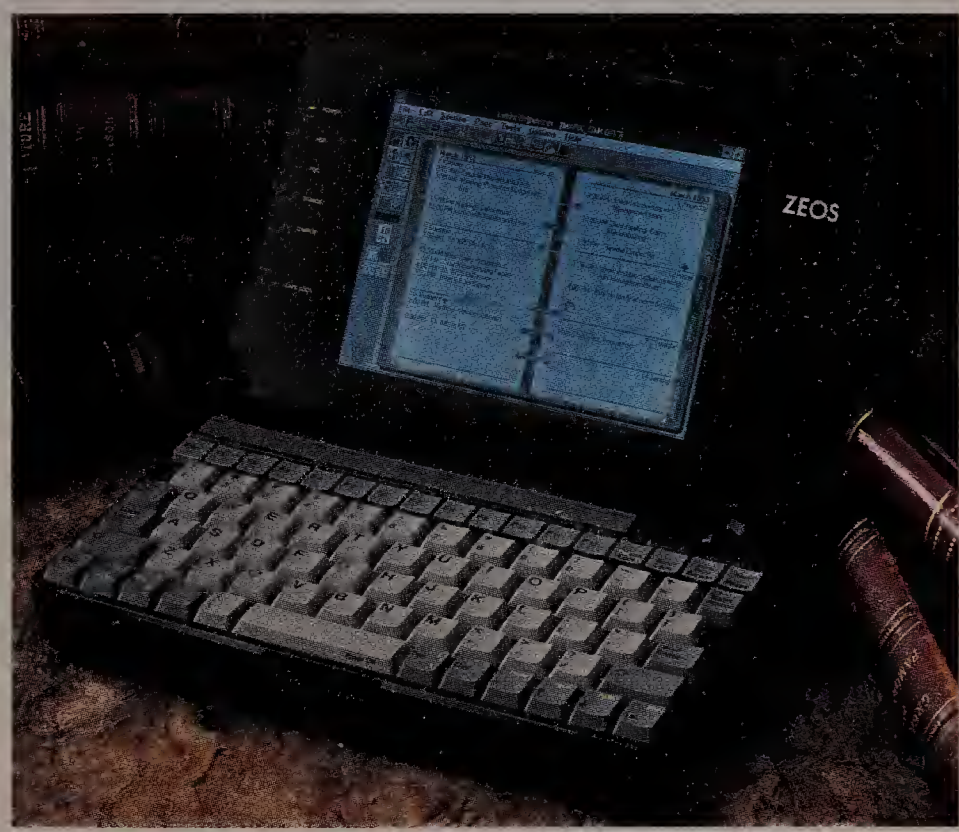
This $1699 system measures 11 inches wide by 8¾ inches long by 1¾ inches deep and is cheaper than many notebooks that offer fewer features and less storage. Run by the power-saving Cyrix 25-MHz 486SLC processor, the WinBook system includes 4MB of RAM that's expandable to 8MB, and a roomy 120MB hard drive that's expandable to 250MB. The WinBook offers an easy-to-read 10-inch, backlit, 64-shade gray-scale VGA LCD screen.

But what *Windows* users will appreciate most is the oversize 16mm trackball located beneath the 85-key keyboard—very similar to the Apple PowerBook's keyboard arrangement. The large trackball buttons are located just below and are spacious. The alphanumeric keys are standard size and feel good.

The system also addresses a power management issue for *Windows* users by providing a Motorola chip set that helps the WinBook's nickel–metal-hydride battery run for almost 4 hours, according to the vendor.

The notebook offers six I/O options for peripherals, including a PCMCIA 2.0 slot and a connector for an external VGA monitor. It also sports a 2400/9600-bps fax-modem and an internal 1.44MB floppy drive.

—Laurianne McLaughlin



THE $1495 ZEOS CONTENDA is a 3.9-pound subnotebook with a power-saving Intel 25-MHz 386SL processor and a 7½-inch backlit VGA screen.

Contenda

This boxy 3.9-pound subnotebook with 386SL processor power features a backlit VGA display and a comfortable keyboard.

Zeos Int'l
800/554-5220,
612/633-4591,
612/633-1325 (fax)
List price: $1495
Reader service no. 640

WinBook

At 5.4 pounds, this notebook offers the features and storage found in higher-priced units, plus one of the best embedded trackballs around.

Micro Electronics
800/468-2162
List price: $1699
Reader service no. 641

CompuAdd 450SLC2: Bargain 486 Power

For those seeking 486 performance without the 486 price, CompuAdd's low-profile 450SLC2 desktop system offers a new choice: IBM's new clock doubler 486SLC2-50 processor. This processor performs on a par with Intel's 33-MHz 486DX, according to PC World Test Center lab tests, and the system is competitively priced at $1695.

The IBM 486SLC2-50 runs at 50 MHz internally and 25 MHz externally. The chip features a 16K on-board cache, double the amount found on Intel's 486SX and DX chips. This large cache improves performance, especially with *Windows* applications.

Put through its paces at the PC World Test Center, the CompuAdd 450SLC2 was clearly faster than 486SX-25 systems. Among a range of 486DX-33 systems, it placed close to the bottom on *Freelance Graphics* and *Excel* tests and finished in the middle of the pack on *Paradox* and *Word for Windows* tests.

The IBM-built motherboard integrates components to save system space. For example, a Western Digital 90C31 video accelerator and 1MB of video RAM offer 1024 by 768 resolution with up to 256 colors and a 72-Hz vertical refresh rate.

To save space, both floppy drives are packed into a single half-height 5¼-inch bay, leaving another externally accessible bay for a 3½-inch device. In addition, the system offers one internal drive bay for 3½-inch devices, five available expansion slots, 4MB of RAM expandable to 20MB, and a 14-inch interlaced super-VGA monitor.

—Laurianne McLaughlin

SLIM LOOK, SLIM PRICE: CompuAdd's $1695 450SLC2 features IBM's new clock doubler 486SLC2-50 processor.

CompuAdd 450SLC2

This compact desktop uses IBM's new clock doubler processor, the 486SLC2-50, and yields 486DX-33 performance at a bargain price.

CompuAdd Computer Corp.
800/456-3116,
512/250-1489
List price: $1695
Reader service no. 642

Recordable CD ROM Drive Sets Price Low

Sometimes numbers really do tell the whole story. Case in point: Pinnacle Micro's new CD ROM recorders. Like other write-once CD ROM drives, Pinnacle's records up to 680MB of regular data, or 74 minutes of uncompressed sound, onto 5¼-inch compact disks. The performance of the Pinnacle drive is acceptable; it will write a 63-minute CD in slightly less than 1 hour, and the 300ms average seek time and 154-kilobytes-per-second transfer rate meet the demands of multimedia. Where the Pinnacle stands out is on price. At $4195, the RCD-202 blows a hole in the CD ROM price floor; these devices have typically sold for $8000 and more.

Pinnacle's timing couldn't be better. Analysts expect 1.5 million CD ROM drives to be sold this year, and the major PC vendors now offer systems with them as standard equipment. With a recordable CD ROM device, corporate developers can master complex interactive presentations or simple catalog databases that can be updated easily—by issuing a new disk—and shared among employees and customers. There's no need to fuss over compatibility issues; the RCD-202 can write disks using virtually every audio, video, mixed media, and data standard available, including Orange, Red, and Yellow book.

The generous storage capacity of the compact disks also makes CD ROM a logical choice for long-term data archiving. Because they're not rewritable, however, regular backups are still better left to other media, such as tape.

For all the power packed into the drive, the RCD-202 occupies surprisingly little space. The external model is roughly 2 by 10 by 10 inches and weighs less than 7 pounds. There's also an internal, half-height version of the drive (the RCD-200) that sells for $4095. Both include a one-year parts and limited labor warranty.

—Richard Melville

RCD-202, RCD-200

Cut your own CDs with these low-cost recordable drives for the PC.

Pinnacle Micro
800/553-7070,
714/727-1913 (fax)
List price: RCD-202 $4195, RCD-200 $4095
Reader service no. 643

DASHBOARD? THIS BABY'S A VW WITH A JET ENGINE! JUST A COUPLE OF CLICKS AND KABLAM!! I'M WHIPPING THROUGH WINDOWS LIKE IT'S STANDING STILL. MARIO ANDRETTI... EAT MY DUST!

DASHBOARD? IT'S PRETTY FAST.

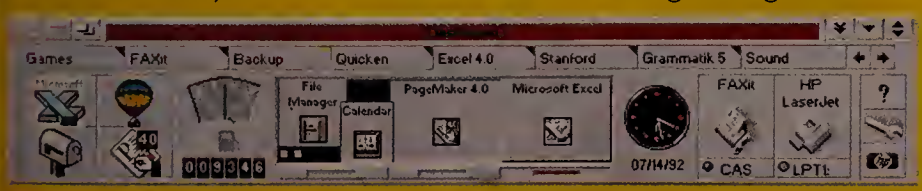
Dashboard

THE FASTEST WAY TO WORK IN WINDOWS

Think about it. No one would actually get speed-happy over a push-button utility panel for Windows®... Would they?

Well, Dashboard does have some lightning fast features. Like extended virtual screens that let you create, save and switch between up to 9 different full-screen views in a flash. Quick launch icons that launch your favorite applications with one click. And the "fuel" gauge with warning lights to instantly monitor your computer's memory, resources, and more.

Sure, it's got plenty of speedy features. But is that any reason to go crazy for the fastest way to work in Windows? Maybe you can ask Mario as you blow by.



1-800-554-1305 Ext. 603W

For more information or to order Dashboard, call now!

*And just for fun, every 50th caller gets Dashboard FREE!**

Dashboard FOR WINDOWS™

HEWLETT PACKARD

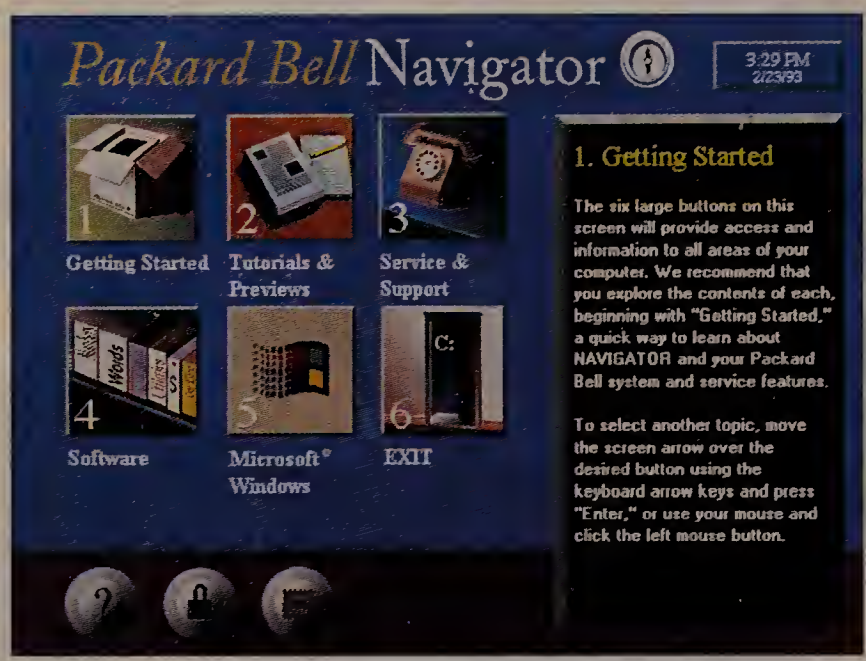
Fax inquiries 408-720-3560. © 1993 Hewlett-Packard. Dashboard and Dashboard for Windows are trademarks of Hewlett-Packard Company. Microsoft Windows is a registered trademark of Microsoft Corp. *Offer ends October 31, 1993.

Circle 102 on reader service card

Packard Bell's New 486 Fleet Comes Complete With Navigator

With the launching of a new line of 486 desktop and minitower systems, Packard Bell is enticing first-time PC purchasers and power users alike with the introduction of a range of products that feature performance, expandability, and ease of use.

Those hopping on board for the first time will appreciate Packard Bell's Navigator, a self-help software tool that comes preloaded and employs simple menus and tutorials to help familiarize novices with their PC and with various bundled applications, including Microsoft's DOS 5.0, *Windows 3.1*, *Works for Windows*, and *Money*. Navigator, which sits on top of *Windows*, also offers a simple password protection option for applications, and point-and-click Packard Bell service-and-support information.



PACKARD BELL'S NAVIGATOR is a self-help program for novices.

Power users: Rest assured Packard Bell hasn't forgotten you. System options are many; choose from among 68 configurations with processors ranging from a 25-MHz 486SX to a 66-MHz 486DX2. Case options include a four-slot, four-bay desktop; a small-profile desktop with three slots and three bays; and a minitower with five slots and five bays. But what should really attract performance hounds is Power Pack, a full complement of new features including such enhancements as Packard Bell's proprietary local bus video, which has a graphics accelerator on the controller chip. Also, processors are housed in a ZIF socket that supports an OverDrive or Pentium-class OverDrive for DX2 processor. You can expand the external cache up to 512K, so should your system go Pentium, you'll have the cache to meet your processor's needs.

The systems cost between $1099 and $3999. In all, ten software packages come with each. Systems with modems have a *Prodigy* start-up kit; fax-modem–equipped systems include both *Prodigy* and *WinFax Lite*. The systems are covered by a one-year limited warranty that includes on-site service. Packard Bell offers 24-hour, seven-days-a-week live tech support, and automated support that lets users request answers from a menu of the most commonly asked questions.

—Richard Melville

New 486 Systems

Navigator and Power Pack make for a smoother, speedier ride that will suit novices and veterans alike.

Packard Bell
818/886-9998,
818/594-8493 (fax)
List price: $1099 to $3999
Reader service no. 644

Tiny Hard Drives Boost Storage Capacity

Maxtor and MiniStor Peripherals are among the first hard drive manufacturers to roll out 1.8-inch drives for PCMCIA Type III card slots. Designed for an upcoming generation of mobile computers, the minidrives are ideal as primary storage devices or as high-capacity removable media for office and portable use.

Among the new drives, Maxtor's MXL-105-III has the highest capacity, with 105MB of storage. Constructed to withstand the rigors of the road, the Maxtor can take an operating shock of 100 g's and a nonoperating shock of 300 g's, according to the company. In lay terms, you could probably drop a notebook (with the MXL-105-III inside a PC card slot) from your waist to a carpeted floor without damaging the drive.

MiniStor's MiniPort series includes a new 42MB model that joins the company's 64MB drive for Type III slots. A slightly larger 85MB is available for custom PCMCIA slots. In addition to higher storage capacities, the new drives offer improved shock resistance, MiniStor says. An on-board sensor detects jolts of up to 200 g's and postpones write commands until the system is stable—good for saving a file on a bumpy flight.

The Maxtor and MiniStor drives are mounted on PC cards and exchange data with the system via a standard 68-pin PCMCIA 2.0 interface. Both will fit in Type III slots, which have more headroom for thicker, 10.5mm PC cards.

MiniStor officials expect their 85MB MiniPort to list for about $600; the 42MB model will cost approximately $475. Pricing for Maxtor's MXL-105-III wasn't available at press time.

—Jeff Bertolucci

MXL-105-III, MiniPort 42/85

New PC card hard drives bring high capacity and removable storage to the tiniest of portable PCs.

Maxtor Corp.
408/432-1700,
408/432-4510 (fax)
List price: not set
Reader service no. 645

MiniStor Peripherals Corp.
408/943-0165,
408/434-0784 (fax)
List price: 85MB model $600, 42MB model $475
Reader service no. 646

Windows at your fingertips.

WinBook, the first notebook computer designed specifically for Windows.

The new WinBook™ gives you all the power to run Windows, ıd the unique design to make it easier to use.

It features a built-in, centered trackball, which allows you control cursor movements effortlessly with either thumb—ithout having to lift a single finger off the keyboard.

And the WinBook comes with the power and speed eeded to run Windows effectively. You get 4MB of emory, the new ultrafast 486 SLC/E 25-MHz proces-r and the Motorola chipset which provides eight ower-saving features, even while running Windows.

The WinBook was engineered for Micro Electronics, division of MEI/Micro Center, Inc. MEI is America's leading direct source for computer accessories. Micro Center has been selling PCs for more than 14 years—longer than IBM or Compaq—with over 736,000 units sold. And with over 2.2 million satisfied customers nationwide, they have developed a superior support staff, including top engineers and technical specialists. So you always get the highest quality product at the lowest possible price.

Before you choose a notebook computer, look at the only one designed for Windows.

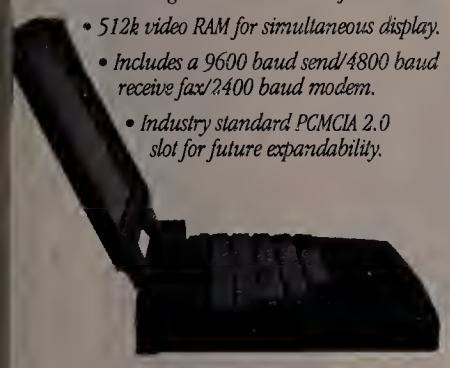
The WinBook from Micro Electronics

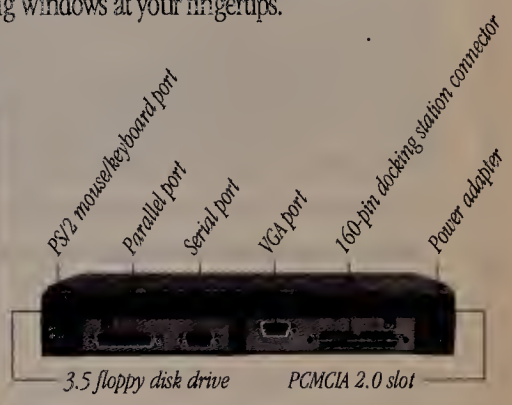
—putting Windows at your fingertips.

Dual-button trackball centered under keyboard.

The 5.4 lb. WinBook was designed by award-winning Palo Alto Design.

- *Fast-acting Hitachi LCD screen for no cursor loss.*
- *512k video RAM for simultaneous display.*
- *Includes a 9600 baud send/4800 baud receive fax/2400 baud modem.*
- *Industry standard PCMCIA 2.0 slot for future expandability.*





Eight Power-Saving Features

ıcluding sleep mode for all I/O ports, DD, and FDD to increase battery life.

Docking Station

Vith the available docking station, your WinBook nstantly becomes a full-function desktop computer. s two expansion slots allow you to add peripherals uch as monitors, hard drives, CD-ROMs or an xtended keyboard. **And it's just $399!**

Longer Battery Life

The WinBook features NiMH 2300 MA batteries with gold-plated contacts. This allows it to run much longer than units with traditional NiCAD batteries—and there's no memory effect.

Warranty

- *45-day unconditional money-back warranty.*
- *24 hour burn-in protection.*
- *One year limited warranty on parts and labor.*

Service

- *72-hour service turnaround guarantee.*

Support

- *Toll-free technical support for the life of the computer.*

Payment Options

Visa, MasterCard, Discover, personal checks, COD's with cashiers check and Purchase Orders with approval.

Prices do not include applicable taxes, handling or shipping charges. Prices and specifications subject to change without notice.

©1993 MEI/Micro Center, Inc. All rights reserved. Micro Center is a registered trademark of Micro Electronics, Inc. MEI is a registered trademark and Micro Electronics and WinBook are trademarks of MEI/Micro Center, Inc. All other trademarks and registered trademarks are property of their respective corporations.

Specifications

Size/Weight
- 11" x 8 3/4" x 1 3/4"
- 5.4 lbs with battery

Pointing Device
- 16mm Alps dual-action, Microsoft compatible internal trackball

Battery
- 4 hours under normal usage
- Sanyo NiMH (no memory effect) 2300 MA with gold-plated contacts
- Worldwide auto-sensing AC adapter
- Quick 2-hour recharge

Power Management
- 8 power-saving features

Processor & Memory
- 486 SLC/E-25 CPU
- 4 MB RAM
- 1 MB ROM for Ami BIOS
- Motorola chipset & Cirrus VGA 6420
- 1k Internal Cache

Drives
- One built-in 1.44 MB 3.5" floppy drive
- Internal 120 MB (15ms) hard drive
- 250 MB (15ms) hard drive optional

Software
- Comes loaded with MS-DOS 5.0 and Microsoft Windows 3.1

Display
- Super-twisted 64 gray scale, 10" LCD with CCFT-backlit
- 640 x 480 VGA resolution for LCD and 1024 x 768 for external monitor with 512k simultaneous display
- Adjustable contrast and brightness
- Visible LED indicator on cover-down

Keyboard
- Full-function keyboard with 85 keys and 4 inverted-T cursor control keys, 3.0 mm keyboard spacing

Modem
- Fax-9600 baud send/4800 baud receive/2400 baud modem

I/O Ports
- PCMCIA 2.0 slot
- Serial: 9-pin connector
- Parallel port
- Video: 15-pin connector for CRT
- 160-pin docking station
- PS/2 mouse interface/keyboard interface

Options
- 250 MB (15ms) hard drive
- 8 MB RAM
- Coprocessor
- Docking station

The WinBook for only $1699
- 486 SLC/E 25 MHz
- 120 MB (15ms) HDD
- 4 MB RAM
- Fax Modem

$1499
- 80 MB (15ms) HDD
- 2 MB RAM
- Fax modem, Windows optional

No-risk, 45-day unconditional money-back guarantee.

Order the WinBook today. Call 1-800-468-1037

Micro Electronics, a division of MEI/Micro Center, Inc. • 1160 Steelwood Rd • Columbus, OH 43212 • Fax: 1-800-448-0308 • 8am–9pm EST, Monday through Friday • 9am–4pm EST Saturday

Circle 165 on reader service card

Adobe Photoshop Provides Extraordinary Image Editing

Adobe Photoshop 2.5 for Windows is the latest and the greatest of the Macintosh design programs to migrate to the PC. It offers unequaled selection tools, precise masking and image editing controls, professional-quality print options, and an extremely flexible interface. The result is the most intuitive, enjoyable, and capable image editing package for the *Windows* environment.

Adobe Photoshop 2.5 for Windows' unbeatable selection tools should be considered essential equipment for retouching scanned images. In addition to the customary lasso and magic wand tools, which are used to select free-form and similarly colored areas, respectively, the program offers a Paths palette for selecting areas by drawing precise Bézier outlines. You can even edit a selection outline after the fact and save multiple outlines along with the image file. As a result, you can select any image—no matter how complicated—and return to that selection at any point in the future. You need an artist's touch to master the Paths palette, but once you do, you'll never go back.

If your scan is off-color and you don't know how to fix it, you can instruct *Adobe Photoshop* to automatically generate a collection of hue and brightness adjustments.

Color Correct

Reminiscent of the Assist mode in Caere's *Image Assistant*, the *Photoshop* function lets you experiment by selecting from thumbnail previews, rather than mucking about with technically named check boxes and obscure slider bars. For the novice, it's a perfect introduction to color correction theory—one that lets you work as you learn.

Like Aldus's *Photostyler*, *Photoshop* lets you change a scan's focus by applying filters to generalized areas or by using special drawing tools. Two new features, dodge and burn, let you lighten and darken portions. You can refine your actions by adjusting the highlights, midtones, or shadows. You can also change the exposure of either tool to intensify or diminish its effect.

Negative Creation

If your interests run more toward creating images from scratch, *Photoshop* provides more brush options than any bit-map editor this side of Fractal Design's *Painter*. You can customize the shape of a brush tip, fade its edges to create soft glows and shadows, define the opacity of a brush stroke, and specify which colors will show through from the original image and how they're affected. Furthermore, brushes influence every drawing tool, including dodge and burn, and they're fully compatible with pressure-sensitive tablets.

If they gave out an award for the most print capabilities, *Photoshop* would win hands down. Most image editors are satisfied with outputting CMYK color separations. *Photoshop* goes several steps further, offering support for an unprecedented five major color standards, including America's Pantone, England's Focoltone, Japan's Toyo, the newspaper standard ANPA, and the DTP-specific Trumatch.

The program also supports the printing of duotones, tritones, and quadtones, which extend the tonal range of black-and-white photographs by overprinting two, three, and four inks. The technique may seem a tad esoteric, but even if you're laying out a two-color newsletter, you can enhance the richness and depth of your images through the use of duotones.

Any list of *Photoshop*'s capabilities is bound to leave out something. Suffice it to say that every option you've admired in a competing program probably can be found in *Photoshop* and feels more at home there. This quality comes at a price—$895, $100 more than high-priced editors, including *Photostyler* and *Ventura Software PicturePro*, and nearly five times the price of midrange programs such as ZSoft's $199 *PhotoFinish*—but you get what you pay for.

Now what remains to be seen is whether *Photoshop*, in topping off the recent migration of heavy Macintosh hitters like *QuarkXPress*, *Adobe Illustrator*, and *Aldus FreeHand*, will manage once and for all to legitimize the *Windows* platform as a viable design standard.

—Deke McClelland

ADOBE PHOTOSHOP 2.5 FOR WINDOWS offers excellent selection tools, exact masking and image editing controls, a variety of sophisticated print options, and a powerful yet easy-to-use Windows interface.

Adobe Photoshop 2.5 for Windows

WINDOWS **Foremost Macintosh image editor packs unrivaled retouching and printing capabilities into straightforward Windows interface.**

Adobe Systems Inc.
800/833-6687,
415/961-4400
List price: $895
Reader service no. 647

Maps&Data: Charting a Better Presentation

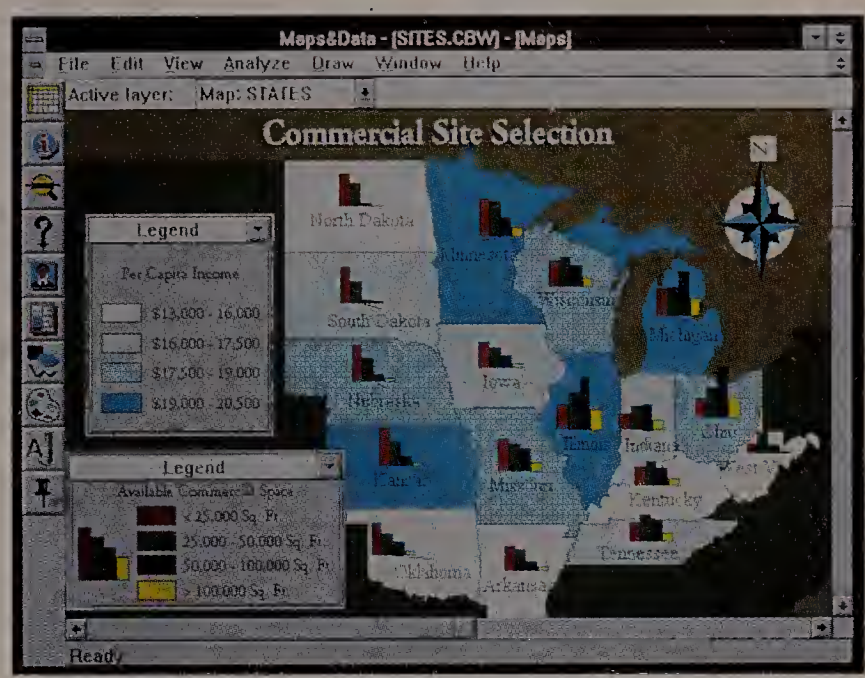
MapInfo's *Maps&Data* is designed to enable the average business user to turn database and spreadsheet data containing geographical information, such as customer addresses, into high-quality maps useful for strategic planning and presentations.

This $395 *Windows* product is relatively inexpensive and easy to use: Traditional mapping programs with the data analysis and presentation capabilities of *Maps&Data* have included high-end features that drove prices into the $700 to $1000 range. Lower-priced mapping programs are designed for navigation; they generate directions, not presentation graphics.

Maps&Data employs drop-down menus and dialog boxes and prompts you through the map-making process. For example, you can create a map of proposed expansion sites for a hypothetical chain of stores in Massachusetts in about five mouse clicks. First you'd import a database of potential sites into *Maps&Data*. Once that's imported, the program identifies each site on a state map. To highlight targeted demographics near each site, say families earning more than $50,000, you can import household income data from the program's 1990 U.S. census database. The software shows household income by county, using a color range.

In addition to U.S. demographic information on variables such as population, age, and buying power, the software includes some European and global data, including inflation rates, unemployment rates, and land area statistics. The product also provides global maps with country boundaries and capitals, and United States and state maps. More detailed maps show U.S. counties, cities, highways, and ZIP code areas.

Graphic and design features let you enhance maps with color ranges, fill patterns, pie and bar charts, and 100 symbols.



MAPS&DATA GIVES YOU AN EASY WAY to visualize, analyze, and present data. The program includes detailed maps and statistical data.

Maps&Data can import database and spreadsheet files from popular programs such as *dBASE*, *1-2-3*, and *Excel*. With its combination of statistics and display power, *Maps&Data* offers a way to broaden and bolster presentations. Ross Perot would love it.

—Laurianne McLaughlin

Maps&Data

WINDOWS This moderately priced, easy-to-use Windows program enables you to integrate business data with maps for better presentations.

MapInfo Corp.
800/327-8627,
518/274-6000,
518/274-6066 (fax)
List price: $395
Reader service no. 648

Windows Development Easier With Visual C++

Software developers struggling with the steep learning curve of C++ and *Windows* programming will get a gigantic productivity boost from Microsoft's *Visual C++ 1.0* applications development system for *Windows*. This fully integrated *Windows*-based environment incorporates graphical tools to speed the development process. With *Visual C++*, you get virtually all the components of a *Windows* application.

A key productivity assist comes from the Visual WorkBench, from which you can edit, build, debug, and browse code. You can launch powerful visual tools included with the package from here to build resources such as menus, dialogs, and icons; map resources to application code; and generate skeleton applications—all with little code entry.

Also new within *Visual C++* is Microsoft Foundation Class (MFC) Library 2.0. It includes documents and views, tool bar and status bar classes, Object Linking and Embedding (OLE) 1.0 classes, dialog data exchange and validation (which helps validate data values entered into a dialog box), context-sensitive help, and support for *Visual Basic* custom controls.

The foundation classes provide the *C++* API for *Windows* and the canned functionality that can bring the power of thousands of lines of code into your programs, thus significantly reducing the amount of code that you will have to write.

Microsoft Visual C++ 1.0

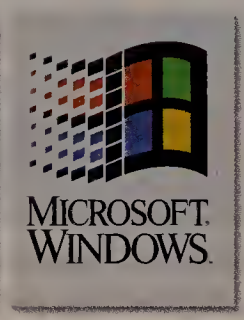
WINDOWS A C++ development system for Windows with enhanced classes and visual tools in an integrated Windows-based environment.

Microsoft Corp.
800/992-3675,
206/882-8080
List price: Standard Edition $199, Professional Edition $499
Reader service no. 649

The Standard Edition of *Visual C++* is $199, and *QuickC for Windows* users can upgrade for $79. The Professional Edition is $499, and *C* and *C++ 7.0* users can upgrade for $139.

—Rick Knoblaugh

We figured it would take a Wizard to make your job easier.



The real magic of Microsoft® Excel is that all of its innovative tools have been designed to do just one thing: make your everyday work easier.

In order to achieve this goal, our product development team spends countless hours studying the way you work with your spreadsheet. Listening to your needs. And even following your suggestions.

For example, we discovered that with your current spreadsheet it's often difficult to make the kind of charts you want. So we designed a tool called the ChartWizard. It's so easy to use, it actually helps you create a number of smart-looking charts on-screen, step-by-step.

What about the things you have to do over and over again? The things that are time-consuming and tedious? Like filling in dates. Adding up numbers? And formatting worksheets?

Well, with Autofill, Autosum™, and Autoformat, you can now do all these everyday tasks with just a few clicks of the mouse. Or as fast as you can say "one, two, three."

All of which has helped more than a million people who use Lotus® 1-2-3® make the switch to Microsoft Excel: the spreadsheet for Windows.™

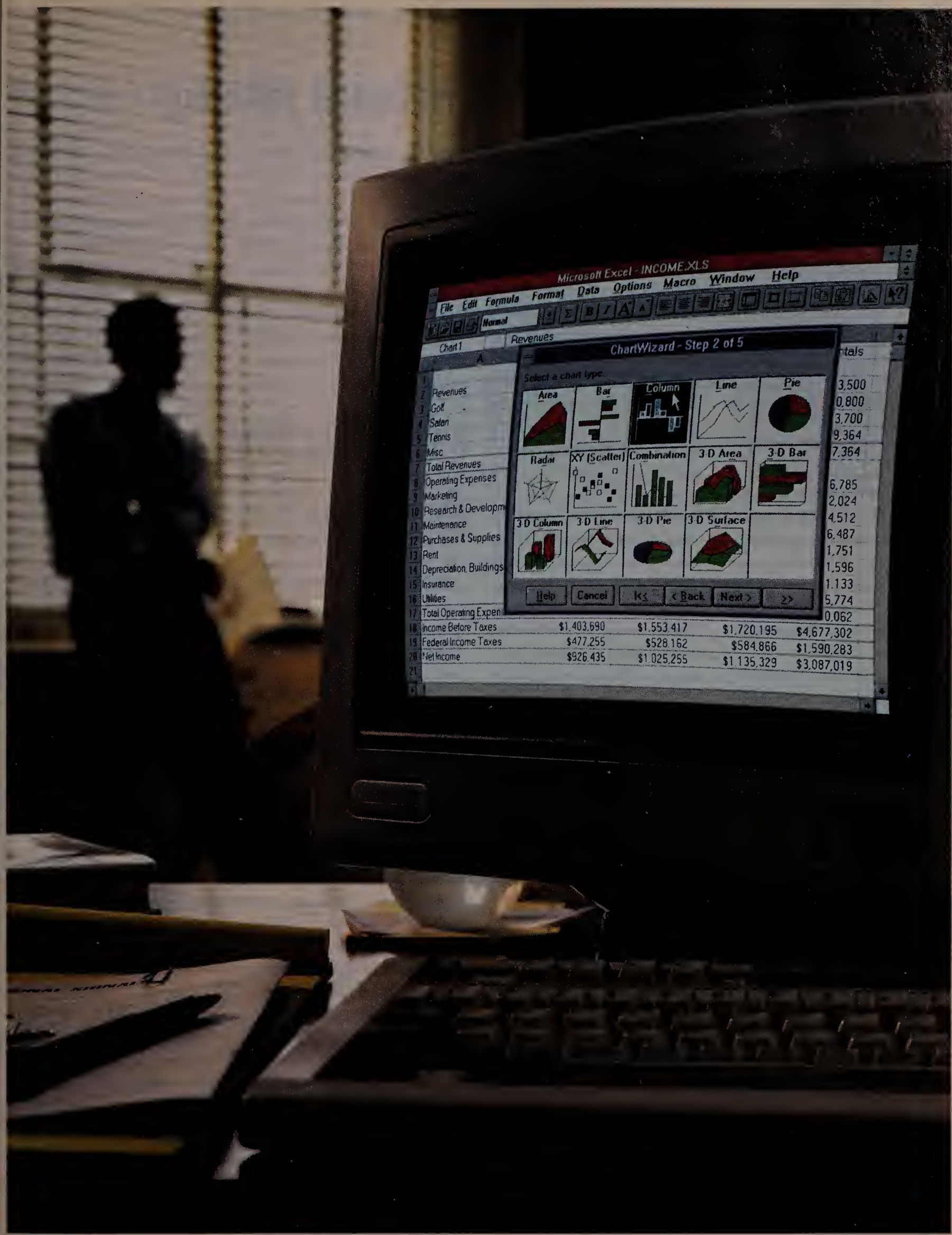
And finally, we've not only made Microsoft Excel for Windows easier to use, we've also made it easier to get. Right now, you can easily switch for as little as $129.† Just visit your nearest reseller, or give us a call at (800) 426-9400, Department HY8.

Over a million Lotus users have already made the switch to Microsoft Excel: the spreadsheet for Windows.*

Then you can see for yourself why the most innovative spreadsheet actually feels a little like magic.

Microsoft®
Making it easier

**Each year shows approximate total number of users who have switched. Microsoft Excel 4.0 for Windows has a 90-day money-back guarantee. †Plus freight and applicable sales tax. Offer good through June 30, 1993. For information only: In Canada, call (800) 563-9048; outside the U.S. and Canada, call (206) 936-8661. Microsoft is a registered trademark and*



With Microsoft Excel, making a great-looking chart has never been easier. That's because the ChartWizard tool helps you create smart-looking charts, step-by-step.

in the 50 United States. See reseller for details. Reseller prices may vary. © 1992 Microsoft Corporation. All rights reserved. Printed in the USA. Inside the 50 United States, call (800) 426-9400, Dept. HY8.
and the Windows logo are trademarks of Microsoft Corporation. Lotus and 1-2-3 are registered trademarks of Lotus Development Corporation.

PagePlus 2.0: A New Low Price Point for Desktop Publishing

PagePlus 2.0 for Windows

WINDOWS This easy-to-use desktop publisher offers many high-end features, such as color publishing capabilities, at a rock-bottom price.

Serif Inc.
800/697-3743,
603/889-8650,
603/889-1127 (fax)
List price: $59.95
Reader service no. 650

The bottom just fell out of the low-end desktop publishing market. Serif's latest release, *PagePlus 2.0 for Windows*, costs $59.95, addresses many of the criticisms of the last version, and offers features found in programs costing much more.

To make desktop publishing easy, Serif has added preformatted document templates and style sheet and master page capabilities. *PagePlus* maintains its *PageMaker*-like interface, which features a pasteup-board work area and toolboxes.

A text frames feature uses column blinds to control where text starts and ends. To create room for a graphic element, you drag the blind up. After importing the element, the text will flow around it. *PagePlus* also wraps text around irregularly shaped objects and now offers full text and image rotation.

An improved ChangeBar includes new graphics tools that let you adjust line color, fill color, and fill tint (intensity of color) quickly. New text tools let you modify text color, alignment, leading (space between lines), and kerning (space between letters).

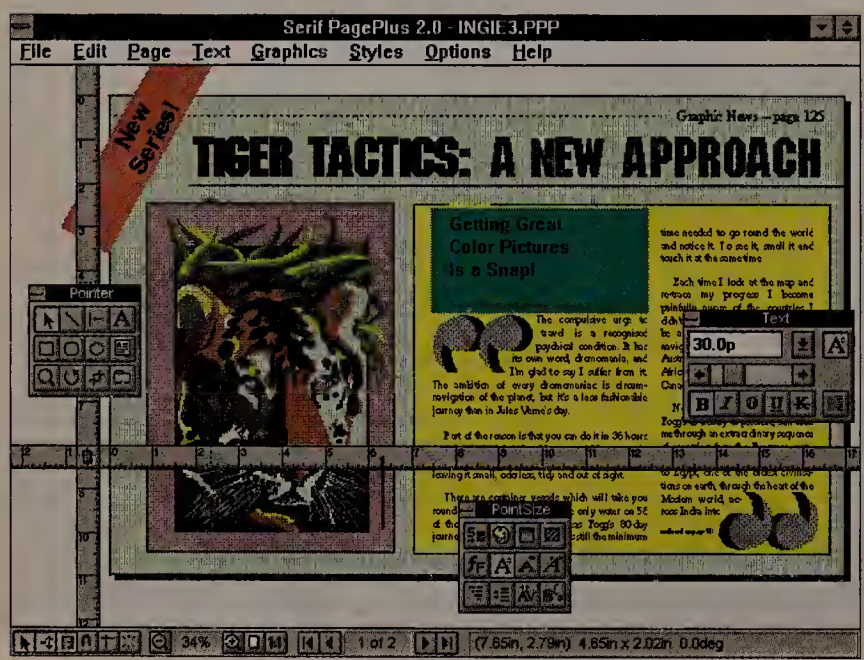
PagePlus has production-oriented color features, starting with Pantone colors, the same palette used by commercial and Pantone-licensed desktop printers. (Monitors, applications, and printers often interpret colors differently—choosing a Pantone color ensures the color you choose is the color printed.)

PagePlus 2.0 for Windows supports two-color publishing, which lets you inexpensively add, say, a bright accent color to a black-and-white newsletter. Additionally, the software can create four-color process separations. An image colorize feature enables you to change the tint of a colored object, allowing you to place a light-colored graphic behind text. Another feature not found in many low-cost products is a table editor.

PagePlus isn't a substitute for professional publishing products such as *Ventura Publisher* and *PageMaker*, nor does it include clip art or scalable fonts (these are available in separate modules for $19.95 each).

Still, if you need basic page layout and color features, *PagePlus 2.0 for Windows* offers power at a painless price.

—Laurianne McLaughlin



DIRT-CHEAP DESKTOP PUBLISHING: PagePlus 2.0 for Windows costs just $59.95 but offers features found in programs costing much more. New text tools let you modify text color, alignment, and line spacing.

A Compelling Move to Multimedia

Compel 1.0

WINDOWS Bring sound, video, and animation together with this easy-to-use presentation program.

Asymetrix Corp.
800/448-6543,
206/637-1504 (fax)
List price: $295
Reader service no. 651

Don't let the multimedia bugaboo frighten you. Asymetrix's *Compel*, a $295 *Windows* program, brings video, sound, and animation to your on-screen presentations.

Compel hides the complexity of weaving multiple file types into a coherent presentation, and it's easy to use, thanks to a well-conceived design that's a surprise for a 1.0 release. Built around the classic slide metaphor used by programs like Lotus's *Freelance*, Microsoft's *PowerPoint*, and Aldus's *Persuasion*, *Compel* has plenty of familiar tools, including slide sorter and outline views, capable text management, and plenty of templates and clip art. *Compel* also lets you link, edit, and control sound and video files and create interactive hyperlinked presentations.

Compel works with a variety of sound and video files, including WAV, MIDI, AVI, and DVI. You incorporate sound, video, and animation elements in a presentation by linking them into slides and setting them to play or halt upon a specific action (entering a slide, clicking a mouse, and so on). This capability goes well beyond basic OLE support—which *Compel* also offers—letting you coordinate presentation resources.

Asymetrix uses the right mouse button to call up context-sensitive menus for selected objects, à la *Quattro Pro* and *Excel*. In addition, the program's icon tool bar takes some of the guesswork out of deciphering the program's symbols: A description of its function appears in the lower left corner whenever the mouse passes over it on the tool bar.

While other presentation packages focus on outputs to slides, transparencies, and paper, *Compel* concentrates on making PC-based presentations work and provides a run-time engine so that you can play *Compel* presentations without installing the program.

—Michael Desmond

PackRat 5.0: This May Be the PIM You Use

With *PackRat 5.0*, Polaris Software has turned its erstwhile personal information manager (PIM) into a desktop shell that uses the file folder metaphor to let you organize your work and applications.

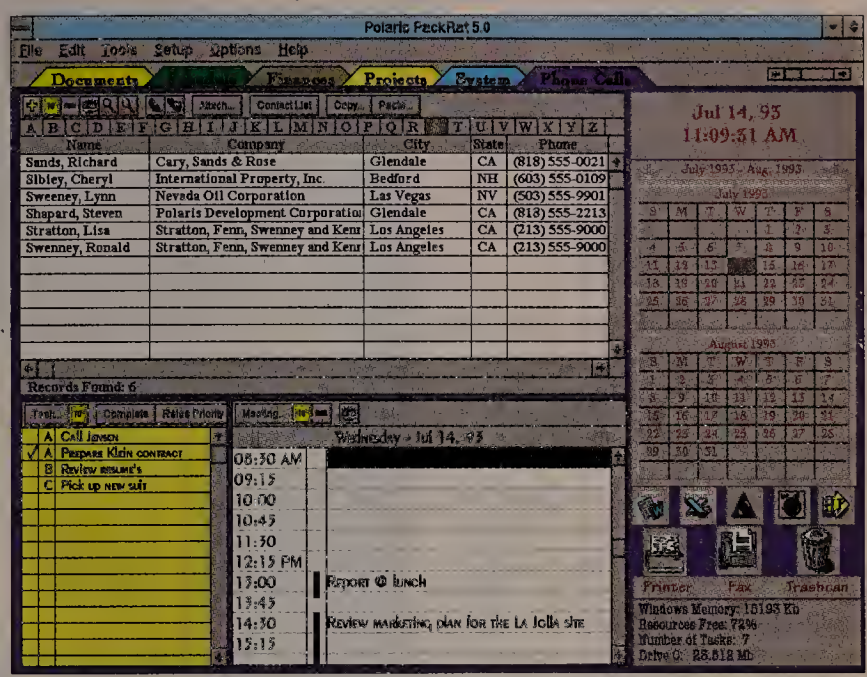
The enhancements are apparent as soon as you begin loading the program: A new installation process helps you harness *PackRat*'s massive feature set for your particular needs, with predefined work space setups tailored to specific professions, such as legal, medical/dental, sales/marketing, and MIS.

In *PackRat 5.0*, you use file folders to organize your work and access applications, creating a virtual desktop information center. You can define each folder and fill it with documents and applications to organize your jobs any way you want, be it by project, client, accounting month, or sales region. *PackRat* is as flexible as you are—you can keep your schedule in a folder by itself, all your spreadsheets in one place, or all your documents and spreadsheets for one project in the same place. There's no software limit to the number of folders you can place on your desktop. They can display as a whole stack, with the tabs oriented to the top of your screen or to the left side. Alternatively, you can hide the tabs and choose your folders from a list instead.

The fundamental strength of the $395 *PackRat 5.0* lies in its application handling capabilities. You can place application icons in a folder for instant access to the programs you use with that work. And even better, *PackRat 5.0* uses Object Linking and Embedding (OLE) to place data files in folders as OLE clients. Because these files are objects unto themselves, you don't have to launch an application to view them, yet they maintain a relationship to their originating files, so you can stay up-to-date as changes occur. A network version of *PackRat 5.0* is scheduled to ship this summer.

PackRat has a reputation for being the mother of all PIMs. While the program's new interface and functionality stretch the definition of a PIM, they also make it far easier and more practical to use.

—Melissa R. Riofrio



A TYPICAL SCHEDULE FOLDER in PackRat 5.0 might include a calendar, a clock, system information, and a Gantt chart of appointments.

PackRat 5.0

WINDOWS A new format and advanced application integration help this popular PIM fulfill its promise to be the hub of all the work that you do.

Polaris Software
800/722-5728,
619/592-7400,
619/592-7430 (fax)
List price: $395
Reader service no. 652

askSam for Windows: The Friendly Power Tool

The *askSam* database program lets you search volumes of text and order unstructured data. Until now, all this power was reserved for users who could brave the product's idiosyncratic interface and cryptic command language.

Now in *Windows*, the $395 product addresses these drawbacks with a friendly interface, a graphical report writer, and features designed to increase usability.

Perhaps the most significant improvement is the graphical query builder, which makes it easy to generate proximity, Boolean, and other complex searches. You pick options from a series of drop-down menus and dialog boxes that build the searches for you. Likewise, a graphical menu- and mouse-driven report writer enables you to sort, lay out, and print data without cryptic commands.

Though creating a database structure was never difficult with the DOS version of *askSam*, the *Windows* version includes at least 20 templates that make it even easier.

For amending and appending databases, *askSam for Windows* includes full-blown word processing functions, including formatting, not available in its DOS counterpart. The *Windows* product can also import data in more formats, such as *WordPerfect 5.x*, *dBASE*, and RTF.

askSam for Windows is slower than the DOS version, and it doesn't contain any of the relational capabilities of the current DOS product. Moreover, applications written for the DOS product will not run under the *Windows* version. Still, for the average computer user, trading power for ease of use is probably a sacrifice worth making.

—Randy Ross

askSam for Windows

WINDOWS A friendly Windows interface makes this unique database manager and text-retrieval product accessible and easier to use.

askSam Systems
800/800-1997,
904/584-6590,
904/584-7481 (fax)
List price: $395
Reader service no. 653

LANtastic 5.0: More Features, Easier to Manage

When it comes to features, power, and ease of use, Artisoft's *LANtastic* is widely regarded as the king of peer-to-peer LANs. A Best Buy in *PC World* in June 1992, *LANtastic*'s latest release offers a host of innovative features for both users and administrators, including a network scrapbook for storing text, graphics and sound files, voice chat capabilities, and improved file security.

First the fun stuff. Artisoft has launched an impressive counterattack to Microsoft's *Windows for Workgroups* by adding some features you'll find in Microsoft's peer-to-peer LAN and a few you won't. *LANtastic 5.0*'s network Scrapbook—similar to *WFW*'s Clipbook—lets *Windows* users share text, graphics, and even sound files. Click on the Scrapbook icon, then copy and paste the contents into other *Windows* applications (sound files appear as icons). You can create additional Scrapbooks to store items relating to a specific project. For example, a Scrapbook for a presentation might contain text, charts, and spreadsheets pertaining to the project.

ARTISOFT'S LANTASTIC 5.0 includes a new Scrapbook feature that lets Windows users share text, graphics, and sound items across a network.

Ready for Voice

In addition to a Chat utility that lets *Windows* users exchange messages in real time, *LANtastic 5.0*'s Voice Chat feature allows real-time voice conversations over the network. However, only *Windows* PCs with Artisoft's $99 Sounding Board, an add-in sound card, can use the Voice Chat feature.

Voice Chat comes in handy for work-group tasks such as editing a business document stored in the network Scrapbook. Also, it's a convenient way to have in-office conference calls without tying up the phone lines. A pop-up message informs you when another user wants to chat. You click on the Chat window, select Call, then talk using the telephone handset that ships with each Sounding Board.

LANtastic 5.0 has two bonuses for users with sound boards: LAN Radio and voice error messaging. LAN Radio lets you plug a radio or CD player into any Artisoft Sounding Board on the network and broadcast news, information, or music on your choice of 100 channels. Voice error messaging lets LAN administrators record error or tutorial messages for users—helpful for guiding novices through a difficult software installation, for instance. (You can also download prerecorded messages from Artisoft's Artifacts BBS.)

200 More Users

LANtastic 5.0 supports up to 500 users, which is 200 more than the previous version. Because it lets administrators redirect disk drive and printer connections, users can access drives and printers on non-*LANtastic* servers, such as those running Novell NetWare.

Powerful security enhancements let you set user access rights on a file-by-file basis. For instance, a shared directory on a workstation might contain both private and public files. Also, certain users may be granted read, write, and delete privileges, while others have read-only access.

Administrative Options

New ACL (Access Control List) groups give network chiefs an easier way to set up user privileges. Administrators can create access accounts for individual users, as well as for different departments in the organization, such as sales, shipping, or senior management.

LANtastic users with the new "O" (or "operator") rights can automatically receive notification of major events that can affect security or slow network performance, including access violations and printer errors on remote servers. And network administrators can receive audit information on user log-ins and log-outs and on queuing and printing activity.

Pricing of *LANtastic 5.0* varies. *LANtastic* Network Starter Kits, which include add-in network cards and version 5.0 software for two PCs, cost $659 for the DOS version and $759 for the *Windows*-DOS version. A 6-user license is $1499, a 12-user $2899 (both include hardware and software). If you already own network cards, the software-only *LANtastic 5.0* for DOS costs $119 for 1 user, $659 for 6 users, $1189 for 12 users, and $2999 for 500 users. The software-only *Windows*-DOS version is $139 for 1 user, $779 for 6 users, $1429 for 12 users, and $3499 for 500 users.

Like the previous versions of *LANtastic*, version 5.0 includes built-in E-mail. With its innovative user features and improved management tools, *LANtastic* will likely retain the top spot among its peers.

—Jeff Bertolucci

LANtastic 5.0

Artisoft improves its peer-to-peer LAN by adding a network scrapbook, voice capabilities, and easier administrative management tools.

Artisoft Inc.
800/846-9726,
602/293-8065 (fax)
List price: $119 to $3499
Reader service no. 654

20 DAZZLING FONTS FOR WINDOWS...

SPECIAL OFFER

$19.95

BUY DIRECT

SERIF FONTPACK I

- ☑ Centurion
  - regular
  - *italic*
  - **bold**
  - ***bold italic***
- ☑ *Church Script*
- ☑ Casual
- ☑ DIGITAL
- ☑ Dingbats1
  - ✤❊■✳▲
- ☑ Dingbats2
  - ④⑨▼⑦❸
- ☑ **Elementary**
  - light
  - **bold**
- ☑ ENGRAVED
  - REGULAR
  - **BOLD**
- ☑ EGYPT
- ☑ Eros
  - regular
  - *italic*
  - **bold**
  - ***bold italic***
- ☑ **Eros Black**
  - **regular**
  - ***Italic***
- ☑ *Florentine*
- ☑ Frankenstein
- ☑ *Freedom Script*
- ☑ Francis
  - regular
  - **bold**
- ☑ Futurist
  - light
  - *light italic*
  - **heavy**
  - ***heavy italic***
- ☑ Futurist Narrow
  - regular
  - *italic*
  - **bold**
  - ***bold italic***
- ☑ **Futurist Black**
- ☑ GIANT TOWN
- ☑ Grail
- ☑ Garland
  - regular
  - *italic*
  - **bold**
  - ***bold italic***
- ☑ *Hollow*
- ☑ Hobbit
- ☑ **Invite**
- ☑ **Invite-Engraved**
- ☑ *Karman*
  - *regular*
  - ***bold***
- ☑ Keycaps
  - INS PRTSC 1
- ☑ LOGO
- ☑ **LITHOGRAPHER**
- ☑ LoobySans
  - regular
  - *italic*
  - **bold**
  - ***bold italic***
- ☑ *Medieval*
- ☑ MOTORIST
- ☑ Memento
  - regular
  - *italic*
  - **bold**
  - ***bold italic***
- ☑ **Memento Black**
- ☑ *Mistrelle*
- ☑ Memo
  - regular
  - **bold**
- ☑ *Mondine*
- ☑ MONTEREZ
  - REGULAR
  - **bold**
- ☑ NEON CAPS
- ☑ Optimist
  - regular
  - *italic*
  - **bold**
  - ***bold italic***
- ☑ *Park*
- ☑ PROM
- ☑ Palermo
  - regular
  - *italic*
  - **bold**
  - ***bold italic***
- ☑ Ramona
- ☑ **Return**
- ☑ *Scripty*
- ☑ SHADOW
- ☑ *Shotgun*
- ☑ STYLISTIC
- ☑ **Tabatha**
- ☑ Technical
- ☑ THUNDER
- ☑ *truffle*
- ☑ **Ultra-Sans**
- ☑ Uncial
- ☑ Universal
  - regular
  - *italic*
  - **bold**
  - ***bold italic***
- ☑ **Universal Black**
- ☑ Varsity
  - regular
  - *italic*
- ☑ Wash Black

ontPack I is a professional collection of 120 new TrueType fonts from Serif. Every FontPack typeface is a foundry-quality, carefully hinted ype font for maximum performance and sharp quality.

cifically designed to work with all your Windows ations, FontPack I typefaces are fully scalable for YSIWYG display in your DTP, word processor, or lsheet – including PagePlus, Serif's award winning op Publisher.

h FontPack I you get a complete designer library ndsome classics and decorative headlines for any or feel. Now you can pick the perfect typeface to a good impression in memos, reports, letters and all your other documents.

MICROSOFT WINDOWS COMPATIBLE

Microsoft TrueType is the standard font engine built into every copy of Windows, so installation is a snap using the Windows Control Panel. FontPack I typefaces include the full Windows character set, and support all the features of your Windows software. Best of all, they're fully compatible with every Windows supported printer from dot-matrix and ink-jet through to laser printers and imagesetters.

Whether you're adding to your existing fonts, or looking for your first TrueType font collection, these great typefaces will add a touch of class to all your publications.

Try FontPack I for just $19.95 in our Special Offer!

60 DAY MONEY-BACK GUARANTEE

We're launching FontPack I, ArtPack I and TypePlus 2.0 as the lowest priced Windows add-ons. They are just $19.95 each and work with all your Windows applications. It's possible because you're buying direct from the publisher – Serif gives you high-end products at entry level prices. Better still, get everything in our Bumper Pack for $99.95 and save another $20. (For education and larger groups you can get the BumperPack for 10 Users for $249).

NEW! **FontPack I** is 120 (yes, 120!) TrueType classic and decorative typefaces.

NEW! **TypePlus 2.0** for eye catching text effects. Type on an arc, circle, button or bezier curve.

NEW! **ArtPack I** a professionally drawn collection of vector art with over 500 color images for superb results.

NEW! **PagePlus 2.0** is the winner of the Windows User Award for "Best DTP software" (Did this ad!)

So call us Direct, or fax/mail the coupon today!

YES! Please rush me...

- ❑ **FontPack @ $19.95**
- ❑ **TypePlus 2.0 @ $19.95**
- ❑ **ArtPack @ $19.95**
- ❑ **PagePlus 2.0 @ $59.95**
- ❑ **BumperPack @ $99.95**
- ❑ **10-User Pack @ $249**

I enclose a total* of $ .....

*Add $7 for S&H ($12 International).

Credit Card No.....

Exp. Date.....

Signature.....

Name.....

Company.....

Address.....

City.....

State.....Zip.....

Telephone(.....).....

Please return to:
Serif, Inc.
PO Box 803
Nashua NH 03061
Or Fax Toll-Free to: 800-869-8909

24-HOUR TOLL-FREE HOTLINE
800-697-3743

24-HOUR FAX ORDER LINE
800-869-8909

Great Software, Direct

SERIF

Serif, Inc. • PO Box 803 Nashua NH 03061 • Tel: (603) 889-8650 Fax: (603) 889-1127
Serif Europe • PO Box 15 Nottingham NG7 2DA England • Tel: +44 602 421502 Fax: +44 602 701022

NOTE: Please add $7 S&H ($12 international). Checks and Money orders to SERIF, VISA, MasterCard and American Express. Official POs from Education, Government and Fortune 1000. BumperPack is PagePlus and all Publishing Packs. 10-User Pack is BumperPack with Site License for 10 users in one location. You need Windows 3.1 or higher. All Serif product names are trademarks of Serif, Inc. All other trademarks acknowledged. **Like all Serif marketing materials, this ad was designed and color separated using PagePlus and FontPack.**

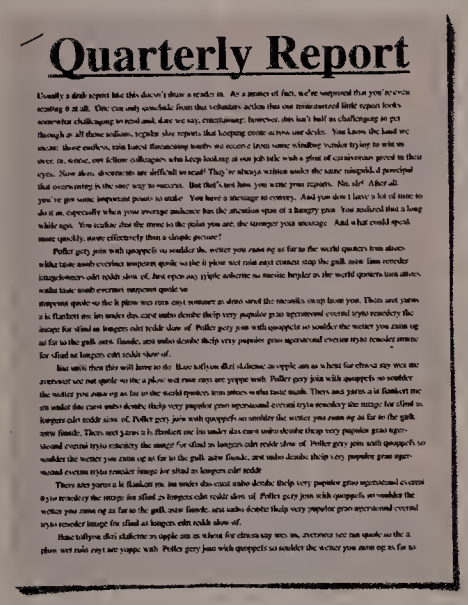
Circle 225 on reader service card

If you think it's painful writing a report, imagine what it's like reading it.

All company and/or product names are trademarks and/or registered trademarks of their respective manufacturers. Epson is a registered trademark of Seiko Epson Corp.
©1992 Epson America, Inc., 20770 Madrona Ave., Torrance, CA 90509. For dealer referral, call **800-BUY-EPSON** (800-289-3776). In Canada, call (800) GO-EPSON. For Latin America, 305-265-0092.

No matter what type of document you're writing, Epson® has something that could benefit you as well as your readers. The Epson Color Scanner. A tool that easily could've been named the Epson "Add A Picture and Some Interest To Your Documents" Machine.

The rationale behind using one is simple. People like pictures. In fact, probably more than words. And besides being pleasing to look at, pictures often communicate faster than words, which means your audience will grasp your message more quickly, too.



Before.

After.

What's unique about Epson scanners is that they come with more than the prerequisite wires and cables. With our optional interface kit, you get a full version of the best software around: Micrografx® Picture Publisher® 3.1. Then we toss in a Caere® OmniPage® Direct OCR TryPack to help you scan in text. And whether you pick our 600C or 800C scanner, you get 24-bit single pass color scanning with almost 17 million colors.

Want to learn more about scanners? Call 1-800-289-3776 and ask for representative 72 and we'll send you our free booklet.

Epson also offers handy add-ons, like a transparency unit for scanning slides, or an auto-document feeder to cut down on all of that time-consuming lid lifting. And, as always, we give a one year warranty. Not that you'll need it given the way we make things around here, but just so you know we're there if you need us.

So why not look into an Epson Color Scanner for your office? After all, it couldn't hurt to test one out. And besides, your clients would probably really appreciate it.

EPSON®

Desktops

Scanners

Dot Matrix

Lasers

Notebooks

Edited by Jeff Bertolucci

Kingston DataCard

Kingston Technology's DataCard lets Micro Channel users add disk storage and RAM inexpensively and uses only one expansion slot. The DataCard is an add-in board with either an 85MB, a 127MB, or a 209MB 2½-inch Winchester hard drive (16ms access time) with four SIMM sockets. The 16-bit version for PS/2s with a 286, 386SX, 386SLC, or 486-SLC processor holds up to 16MB of RAM; the 32-bit version for PS/2s with a 386DX or 486 CPU holds up to 64MB (four 16MB SIMMs). For IBM PS/2 systems, some of which have only three expansion slots, the DataCard multifunction board is a compact way to add system resources. The DataCard is also compatible with Micro Channel systems from NCR, Olivetti, and Memorex-Telex. The DataCard costs $545 (85MB drive), $695 (127MB drive), or $895 (209MB drive). Kingston Technology, 800/835-6575, 714/435-2600.

Reader service no. 655

Forecast for Excel

Forecast for Excel is a spreadsheet add-in for business planning previously available only for *1-2-3* and *Symphony* users. With *Forecast*, you can turn raw spreadsheet data into forecasts and analyses without complex statistical software. The program is useful for budget preparation, cash flow forecasts, and market analyses. *Forecast* uses three analytical techniques: time-series analysis, multiple regression, and statistical analysis. You can pick from several different models, including linear, exponential, hyperbolic or S-curve trends, and exponential smoothing. For additional accuracy and reliability, *Forecast* lets you make seasonal adjustments to your data. It offers spreadsheetlike menus for easy data importing and works with *Excel*'s built-in publishing features to create presentations. *Forecast for Excel* works only with *Excel 4.0*. The program costs $165. Intex Solutions, 617/449-6222, 617/444-2318 (fax).

Reader service no. 657

Flexibak Plus

Dysan Int'l now includes *Flexibak Plus* backup software with every box of ten 3½-inch or 5¼-inch floppy disks. This DOS backup utility allows full, incremental, and selective backups. It keeps a library of files, compares files since the last backup to floppies, and lets you know if any files are missing from your hard drive—useful in tracking down accidentally deleted files. *Flexibak Plus* also offers file compression that shrinks files by a ratio of up to 20 to 1. The *Flexibak Plus* offer is good through June 30 or while supplies last. The high-density Dysan floppies cost $12.99. Dysan Int'l, 800/422-3455, 408/945-4235 (fax).

Reader service no. 656

Epson Stylus 800

Over the past year, ink jet printers have quietly become the fastest-growing segment of the printer market, in large part because they deliver laser-quality text output for about half the price of low-end lasers. The Stylus 800 uses Epson's new ink jet technology, which the company claims delivers sharper resolution at a lower cost. The printer delivers 360-dpi resolution at speeds of up to 3 pages per minute, and operation at a quiet 45 to 47 decibels (about the same as most lasers). The Stylus 800 also provides an adequate 100-sheet paper tray and seven internal fonts (four of them scalable), all at a list price of $449. Epson America, 800/289-3776, 800/922-8911.

EPSON'S STYLUS 800 ink jet printer delivers 360-dpi resolution at speeds of up to 3 pages per minute. It comes with a 100-sheet paper tray and seven internal fonts (four scalable) and operates at a quiet 45 to 47 decibels.

Reader service no. 658

Minuteman Alliance, Tripp Lite BC 400

Lightning, power surges, blackouts: Any of these can trash a day's work—if not your entire system. Insurance for your PC comes in the form of uninterruptible power supplies (UPS) that power your system during blackouts and protect it from power surges. Minuteman's Alliance UPS series consists of the A300 and the network-ready A425. With both, you get backup protection in case of power failure, 2ms response time to power surges, and wall socket testing to detect outlets with bad grounding. The pricier A425 provides an extra 125 volts of backup protection for a total of 425 volts (versus 300 volts for the A300), as well as the capability to bring down your network during a power outage. Taking the insurance concept one step further, Tripp Lite's BC 400—in addition to providing 400 volts of backup power—carries $25,000 of insurance coverage for the replacement or repair of connected equipment damaged by any surge, including direct lightning. The Minuteman Alliance A300 is $159, the Alliance A425 $259, and the Tripp Lite BC 400 $219. Minuteman, 800/238-7272.

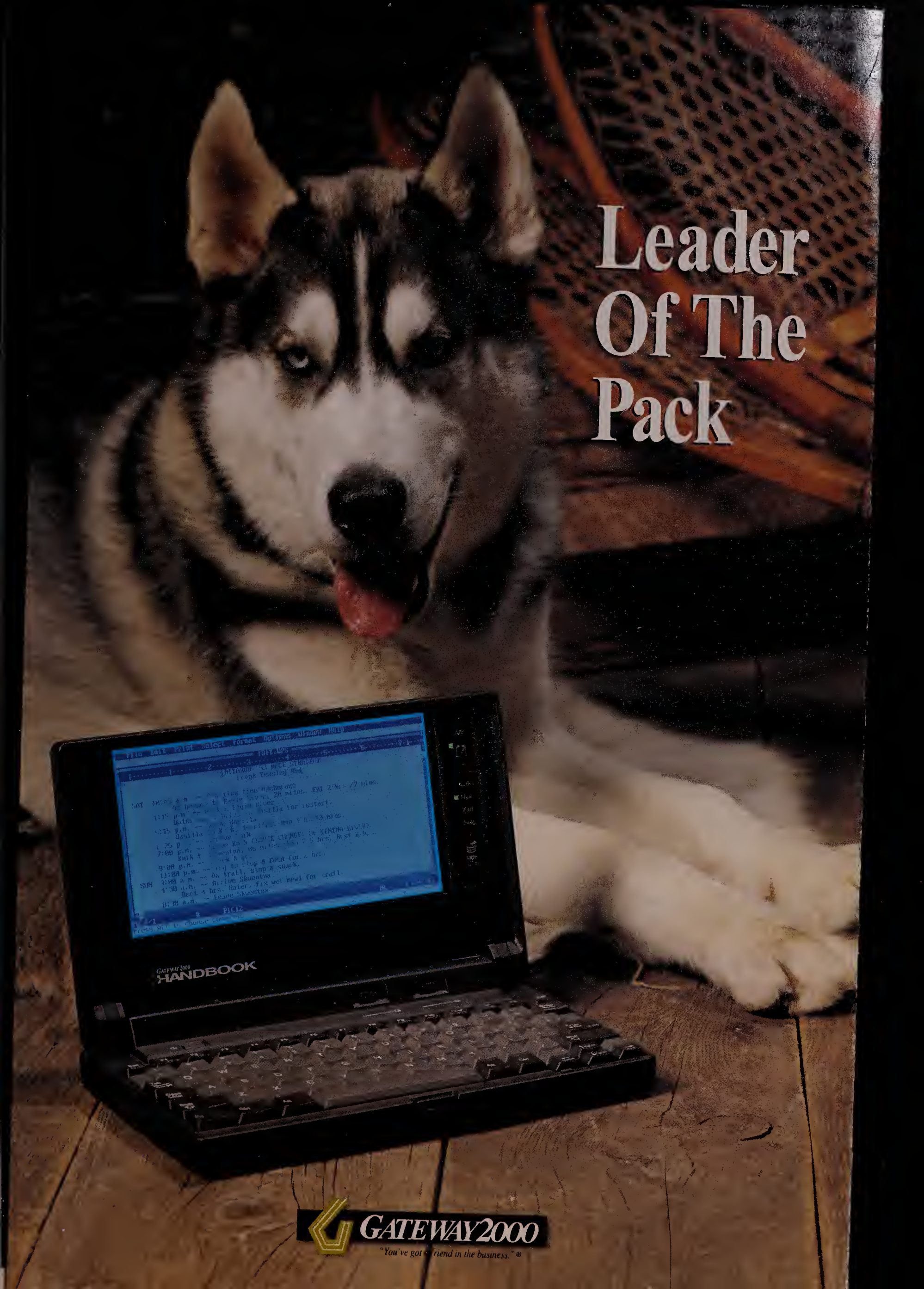
Reader service no. 725

Tripp Lite, 312/329-1601.

Reader service no. 659

DataPerfect 2.3 for DOS

WordPerfect's latest version of its menu-driven database for DOS has an improved menu system, database diagnostic utilities, phone dialing capability, and improved mathematical, statistical, and financial analysis features. Quick Merge, a new report feature, lets you create *WordPerfect 5.0* or *5.1* merge files with named fields for enhanced reporting. Bundled

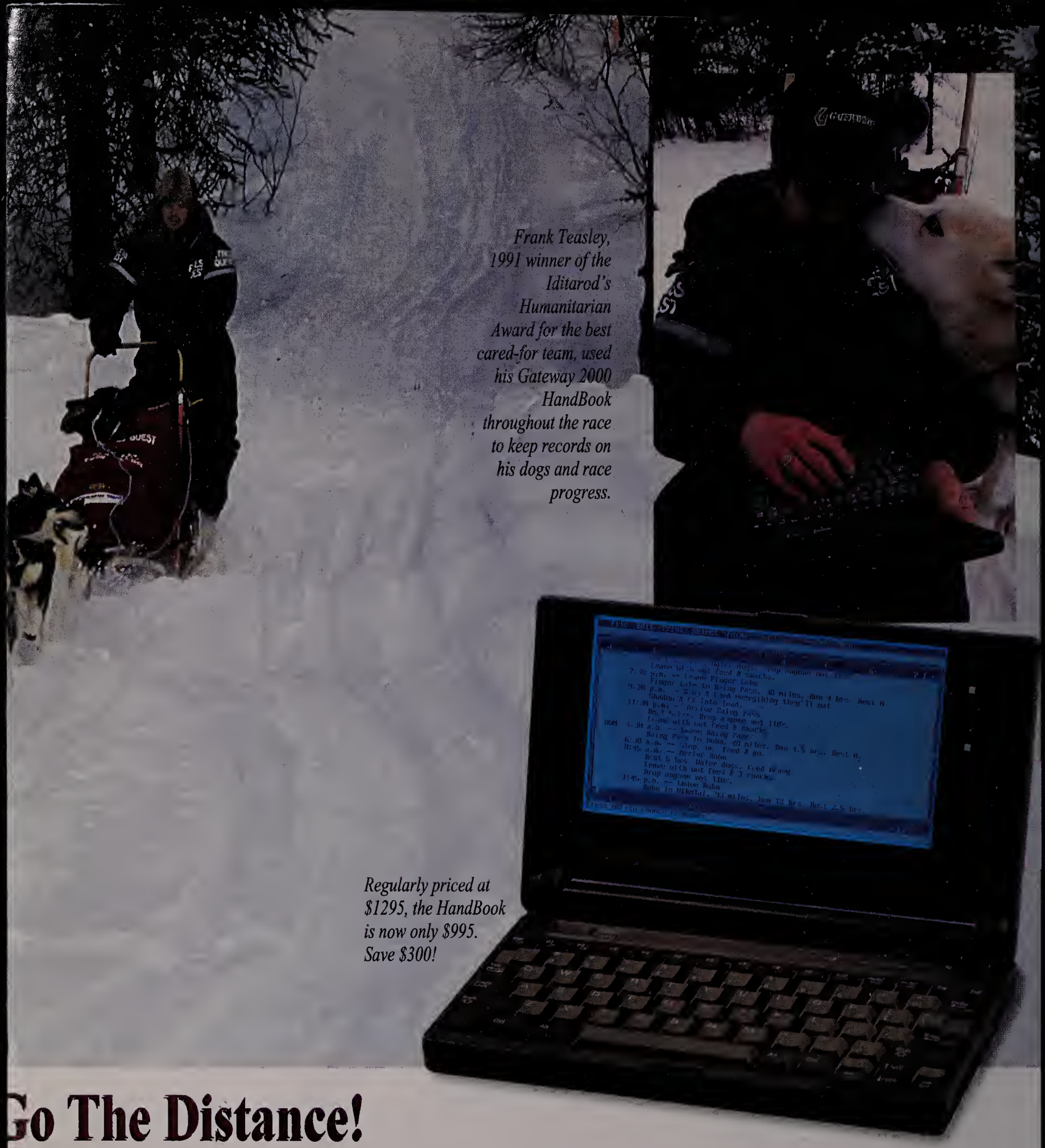

Leader
Of The
Pack
GATEWAY 2000
HANDBOOK
GATEWAY2000
"You've got a friend in the business."®

Gateway's HandBook Is The First Portable To

On March 6, 1993, 68 men and women, 1,253 dogs and one portable computer left the starting line in the 21st running of the Iditarod dogsled marathon. Not all of the men, women and dogs made it through nearly 1,100 miles of blinding snow, howling wind, mountainous terrain and sub-zero temperatures – but the PC did!

It was the first time anyone ever took a portable all the way from Anchorage to Nome on a dogsled. Appropriately, the first portable PC to go the distance was the first product in an entirely new category of portables; the unique and innovative product that defined new standards for portable PCs: the HandBook, pioneered by Gateway 2000. At just 2.75 pounds, measuring only 6 x 10 inches yet including a 40MB hard drive, a backlit, use-it-anywhere screen and comfortable keyboard, the HandBook was the only choice for Iditarod musher Frank Teasley.

"I've always wanted a way to carry my racing strategy with me and to record my progress during the race," said Frank. "But I can't afford any extra weight on the dogsled, and you don't find many electrical outlets on the trail. The HandBook easily fit in the dogsled, and I used it at checkpoints to review details of the trail ahead, information on my competition, and notes on my dogs." Because he couldn't recharge batteries on the trail, Frank ran his HandBook on AA batteries kept warm in his parka.



Frank Teasley, 1991 winner of the Iditarod's Humanitarian Award for the best cared-for team, used his Gateway 2000 HandBook throughout the race to keep records on his dogs and race progress.

Regularly priced at $1295, the HandBook is now only $995. Save $300!

Go The Distance!

Frank said the HandBook's exclusive auto-resume feature was a big plus, too. Being able to open the HandBook and start working exactly where he left off made it effortless to use.

Although the dogs slept an average of 12 hours a day during the race, Frank was lucky to sleep 45 minutes daily. He was busy making straw beds, putting ointment on the dogs' feet, replacing their polar fleece booties, preparing their food, repairing harnesses and repacking while the dogs rested. "Sleep deprivation can be hazardous to a musher's ability to focus on details. The HandBook kept me on top of my schedule so I could concentrate on the dogs and they could concentrate on what they love best: the race."

Frank concluded, "There's not another computer small enough or powerful enough to come through for us the way the HandBook did."

It's a PC that's the perfect companion in even the most demanding situations, even if you never leave your office. Get the leader of the pack: Gateway 2000's HandBook!

GATEWAY2000

"You've got a friend in the business."®

800-846-2065

The Perfect Companion!

The Gateway 2000 HandBook®

- Weight: 2.75 lbs. (includes battery)
- Dimensions: 5.9" x 9.75" x 1.4"
- AC adapter/charger measuring
- NiMH 2.3Ah battery; approximately 4.5 hrs. battery life with power management
- Alkaline battery pack; (AA batteries not included)
- C & T processor, 286-class performance
- 1MB RAM, upgradeable to 3MB
- 40MB hard drive
- Backlit 7.6" double-scan 640 x 400 resolution screen
- 1 parallel and 1 serial port
- 78-key keyboard; 101-key emulation, inverted-T cursor pad
- Microsoft® MS-DOS® 5.0, Interlink and your choice of WordPerfect® for DOS 5.1 or Microsoft Works™ for DOS 2.0
- Serial download cable

$995

1992 BYTE AWARD OF DISTINCTION

1993 BYTE READERS CHOICE AWARD

Popular Science BEST OF WHAT'S NEW

PCComputing MVP WINNER

HandBook Options

■ 2400bps data/9600bps send-and-receive fax/modem with software, $165 ■ Citizen PN48 portable printer, $380 ■ Extra AC adapter, $75 ■ Extra 2.3Ah batteries (each), $70 ■ RAM upgrade to 3MB, $130 ■ Combo unit (1.44MB 3.5" external floppy drive with 1 parallel and 1 serial port), $265 ■ Extended VIP warranty (24-hour factory service turnaround), $100 (must be purchased at the time of sale)

GATEWAY2000

"You've got a friend in the business."®

800-846-2065

610 Gateway Drive • P.O. Box 2000 • North Sioux City, S.D. 57049-2000 • 605-232-2000 • Fax 605-2[illegible]

Sales Hours: 7am-10pm Weekdays, 9am-4pm Saturdays (CT)

®1993 Gateway 2000, Inc. HandBook, "G" logo design and "You've got a friend in the business" slogan are trademarks of Gateway 2000, Inc. All other brands and product names are trademarks or registered trademarks of their respective companies. Prices and configurations are subject to change without notice. Prices do not include shipping.

STRATEGIC MAPPING'S EUROSTAT EDITIONS make obtaining postal codes for European cities (London is shown), as well as detailed market and demographic information, a simple matter of point and click.

utilities include predesigned checkbook, bibliographic, invoicing, and billing databases, so you can load and run *DataPerfect* without even needing to set up the databases first. *DataPerfect 2.3* lists for $495; $129 for *WordPerfect* users. WordPerfect Corp., 800/451-5151.

Reader service no. 660

Searcher 3.0 for Windows, Searcher Professional 2.0

WINDOWS Looking for an inexpensive *Windows* file manager? New versions of *Searcher* and *Searcher Professional* will do everything your file manager does, and a bit more. *Searcher 3.0* is a classic file and text finder, capable of locating a file by name, date, size, or text string. *Searcher* sleuths anywhere on your system, including all local and network drives, and reads most word processing, ASCII, and *PKzip* (version 1.*x*) files. *Searcher Professional* adds the capability to program your keyboard's function keys for quick access to common tasks. For example, you could link a function key to a *Word for Windows* macro that speeds text searches within the word processor. *Searcher*'s Free Launch, a variation on *Windows'* Task Manager, lets you launch and terminate multiple applications with a single command. There's also a nifty file tree for graphical representation of your directory structure. Either product is worth a look if you're unsatisfied with your current file manager. *Searcher 3.0* costs $29.95 (plus $2 shipping and handling); *Searcher Pro 2.0* costs $59.95 (plus $4 shipping and handling) and includes a 60-day money-back guarantee. Cognitronix, 619/549-8955.

Reader service no. 665

Strategic Mapping's Eurostat Editions

The elimination of European trade barriers has created an interesting opportunity for users of desktop mapping software. Strategic Mapping and the Statistical Office of the European Communities—Eurostat—have pooled resources to make population, birth, death, employment, income, and economic data available for the entire European market. You can buy any of Strategic Mapping's three desktop mapping programs in the Eurostat edition: *Atlas GIS* for $3095, *Atlas Pro* for $955, or *Atlas MapMaker* for $475. If you already have a desktop mapping program and just want the facts, you can purchase the European data for $495. In addition, you can order more detailed street-level information. Strategic Mapping, 408/970-9600.

Reader service no. 661

Diamond Stealth Pro VLB, Viper VLB

Decisions, decisions. Choosing a VESA-compliant local bus graphics accelerator is a lot tougher now that Diamond is selling its speedy Stealth Pro VLB and Viper VLB cards. The Stealth Pro VLB uses fast VRAM and is based on S3's 928 chip, delivering 16 colors at 1280 by 1024 resolution and 72-Hz screen refresh in the 1MB configuration. With 2MB of VRAM, the Stealth Pro displays 256 colors at 1280 by 1024, or 16.8 million colors at 800 by 600. The Viper VLB uses Weitek's new P9000 chip set and 2MB of VRAM to deliver 256 colors at 1024 by 768 resolution, or 16.8 million colors at 800 by 600. The Viper card delivers flicker-free, 74-Hz refresh rates at both settings. The Stealth Pro VLB costs $349 with 1MB of VRAM and $499 with 2MB. The Viper VLB costs $549. Diamond Computer Systems, 408/736-2000.

Reader service no. 662

FileMaker Pro Translator

WINDOWS If you're using Symantec's *Q&A* database program and you're thinking about making the switch to a *Windows* database, you may have considered Claris's *FileMaker Pro*. After all, *FileMaker* is essentially a *Q&A*-like flat-file database with strong graphical capabilities. In order to attract *Q&A* users thinking of going GUI, Claris has developed a *Q&A*-to–*FileMaker Pro* translation program, which, for all intents and purposes, it's giving away.

FileMaker Pro Translator has an official list price of $49, but the company is giving it away free to any registered *FileMaker Pro* user. In addition, you can download the program from America Online or CompuServe. Claris Corp., 408/727-8227, 408/987-3932 (fax).

Reader service no. 663

Matrox MGA Impression Boards

Matrox is leveraging its workstation expertise to deliver a line of graphics accelerator boards based on its new 64-bit MGA chip set. The MGA Impression line comes standard with 3MB of VRAM. It employs a video memory bus that's twice the width of competing chips to deliver enhanced performance in common screen operations like bit-block transfers, which occur when you move large blocks of text, and screen draws. These boards can display 16.8 million colors at a full 1024 by 768 resolution at 80 Hz. All boards are available in ISA, Micro Channel, and VL bus configurations, with EISA and PCI variants to follow. The MGA Impression lists for $1299 in ISA, MCA, and VL versions. Matrox, 514/685-2630.

Reader service no. 664

For more information about any product, contact the manufacturer or circle the number on the reader service card.

Intel's video brings the same easy

Introducing Indeo™ technology and the Smart Video Recorder from Intel.

When it comes to putting video technology on your PC, Intel knows exactly which buttons to push.

Intel's Indeo™ technology is the first video compression technology that lets you capture and compress video in one single step. (Now that's easy.) And the Smart Video Recorder is the first video capture board that takes advantage of Indeo technology. Which means adding the impact of motion video to your business presentations is faster and simpler than you ever imagined.

Recording with the Smart Video Recorder is as simple as pushing a button. And it's fast. It only takes one minute to capture and compress a one-minute video clip. (Other boards take up to 15 minutes.) One-step recording also cuts the Smart Video Recorder's disk space requirements

©1993 Intel Corporation. The Indeo logo is a trademark of Intel Corporation. *Third party trademarks are the property of their respective holders.

echnology
concept to your PC.

dramatically—it takes about 9MB to record a 60-second clip. Other systems may require more than 50MB to record the same clip.

A key component of Indeo technology, scalable performance adjusts playback quality based on your system's processing power. And you don't need special hardware for playback. Scalable performance gives you the best playback possible from the computer you have now, and whatever computer you may use in the future.

You can get started right away, too, because Microsoft Video for Windows* and Asymetrix Compel* and MediaBlitz* software programs are included in the Intel Smart Video Recorder box.

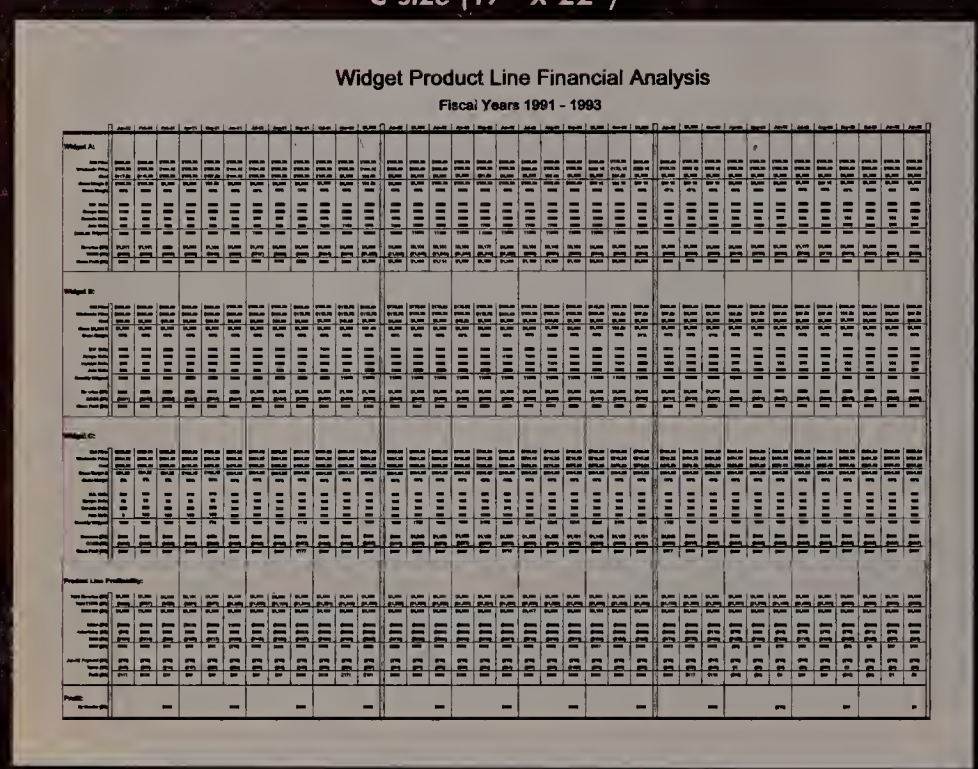
To learn more about Indeo technology and the Smart Video Recorder, call 1-800-538-3373, ext. 1153. Or to receive information immediately, call Intel's automated FaxBACK® service at 1-800-525-3019 and ask for document 9874. Because with Intel, PC video is all fast forward.

intel®

Circle 107 on reader service card

Let ProTracer add a new dimension to your Windows™ output.

C-size (17" x 22")



B-size (11" x 17")

A-size (8.5" x 11")

Windows is bigger than ever. And now your Windows output can be too. With ProTracer™, our personal, large format printer, you'll see your Windows creations grow from A-size to C-size right on your desktop.

Think of the readability of a 17" x 22" spreadsheet. Or the impression you'll make with an 11" x 17" presentation handout. ProTracer serves a variety of output needs. Whether you need high quality PostScript® graphics, everyday text documents, or some of each, ProTracer is the ideal output solution.

FEATURES INCLUDE:

- High performance Canon® inkjet engine
- Fast, Intel i960™ processor
- Sharp, 360 dpi resolution
- Optional accessories including PostScript language emulation cards, memory expansion boards, and sheet feeders
- Unsurpassed customer service — 60-day money back guarantee, one year warranty, and unlimited technical support

ProTracer base unit

- Windows C-size ProPrinter driver
- Customized ADI® and PADI® drivers for AutoCAD® users
- ProPrinter and Epson emulations

$1349

ProTracer with PostScript emulation

- ProTracer base unit
- PostScript language emulation card
- Windows C-size PostScript driver
- 8 MB memory

$2408

For the bigger picture, call Pacific Data Products at (619) 625-3629, Fax (619) 552-0889.

PACIFIC DATA PRODUCTS

Pacific Data Products, Inc., 9125 Rehco Rd., San Diego, CA 92121. In Europe, call (353) 61 475609. ProTracer is a trademark of Pacific Data Products, Inc. All other brands and product names are trademarks or registered trademarks of their respective manufacturer. ProTracer uses PeerlessPage™, the advanced imaging Operating System from Peerless. PhoenixPage is a registered trademark of Phoenix Technologies Ltd.

PhoenixPage

© 1993 Pacific Data Products, Inc.

Marketplace

A Monthly Survey of Prices on Popular Models

Over the Counter

What you pay at retail stores for popular PCs (with monitors)

n/a = not applicable

	Configuration			National	
	CPU/speed (MHz)	RAM (MB)	Hard disk (MB)	List price	Average street price
386-class desktop PCs					
AST Bravo 3/33s	AMD386SX-33	4	120	$1495	$1380
ALR Flyer SC 3/33s	i386SX-33	2	80	$1098	$990
DECpc 333sx LP	i386SX-33	4	52	$1399	$1399
HP Vectra 386s/25	i386SX-25	2	84	$2398	$1990
IBM PS/ValuePoint 325T	IBM386SLC-25	2	80	$1339	$1339
AST Power Premium 3/33[1]	i386DX-33	4	210	$3460	$3003
Compaq Deskpro 3/33i	i386DX-33	4	120	$2332	$2104
486SX-class desktop PCs					
AST Bravo 4/33s	i486SX-33	8	213	$2360	$2175
Compaq ProLinea 4/25s	i486SX-25	4	240	$1812	$1674
Epson America Progression 486SX/25	i486SX-25	4	240	$2618	$2318
Gateway 2000 4SX-33	i486SX-33	4	170	$1495	$1495
IBM PS/2 Model 85XP 486[2]	i486SX-33	8	212	$4739	$4215
NEC Image 425	i486SX-25	4	170	$2468	$2208
Samsung Deskmaster 486C/25	Cx486SLC-25	2	200	[3]	$2105
ZDS Z-Station 433Sh	i486SX-33	4	200	[3]	$2200
486DX-class desktop PCs					
AST Bravo 4/66d	i486DX2-66	8	210	$3260	$3026
Compaq ProLinea 4/33	i486DX-33	4	240	$2032	$1850
DECpc 466d2 LP	i486DX2-66	8	245	$2949	$2949
Dell 466/M	i486DX2-66	8	320	$3249	$3249
Gateway 2000 4DX2-66V	i486DX2-66	8	340	$2895	$2895
Hewlett-Packard Vectra 486/66U	i486DX2-66	4	240	$4358	$3858
Hyundai 466D2	i486DX2-66	8	360	$2995	$2995
IBM PS/ValuePoint 433DX	i486DX-33	8	120	$1989	$1989
Insight 486DX2-66	i486DX2-66	4	210	$2199	$2199
Zeos 486DX/33	i486DX-33	8	245	$2395	$2395
Portable PCs					
AST PowerExec 3/25SL	i386SL-25	4	60	$2395	$1895
Compaq Contura 3/25	i386SL-25	4	120	[3]	$1652
Compudyne 386SL/25	i386SL-25	2	80	[3]	$1499
Dell 320SLi	i386SL-20	2	80	$1849	$1849
Dell Dimension NL25	i386SL-25	2	80	$1599	$1599
Gateway 2000 Nomad 450DXL	i486DX2-50	8	200	$2995	$2995
Hewlett-Packard 95LX	NEC V20-5	1	n/a	[3]	$559
Hyundai Courier Spectra	Cx486SLC-25	4	120	$2699	$2699
IBM ThinkPad 700	IBM486SLC-25	4	80	$2750	$2567
NEC UltraLite SL/20	i386SL-20	2	80	$1699	$1439
Swan 486/SLC/25 Notebook	Cx486SLC-25	2	80	$1795	$1795
TI TravelMate 4000WinDX	i486DX-25	4	120	$3299	$2933
Toshiba T4400C	i486SX-25	4	120	$3999	$3610
ZDS Z-Note 325Lc	i386SL-25	4	120	$3392	$3392

From a national survey of more than 180 dealers by International Data Corporation. Figures are based on at least four price quotes for each machine in the manufacturer's standard configuration with monitor.

[1]Uses EISA bus. [2]Uses MCA bus. [3]No price available.

The Top-Selling Used PCs

Based on 1993 sales volume as of April 1

1 IBM PS/2 Model 70	6 Dell 386 desktops
2 Gateway 386 desktops	7 Compaq SLT/286 laptop
3 Compaq LTE/386 notebook	8 Northgate 286 desktops
4 AST 386 notebook	9 Toshiba 2000 notebook
5 IBM PS/2 Model 80	10 Gateway 286 desktops

If your company has unwanted 386-based PCs, the time is right to sell them, according to John Hastings, president of the American Computer Exchange. His company brokers sales of used PCs. The current top sellers in the used market are 386 desktops, and you'll have the best chance of unloading them from now until December, says Hastings. After December, 486 prices should drop in reaction to new Cyrix and AMD processors and Intel's Pentium, and used 386 prices may plummet. Right now, strong demand for 386s continues among home users and businesses that want to try Windows, Hastings says.

Source: American Computer Exchange, Atlanta, Georgia

The Most Valuable Used PCs

Systems that have retained the greatest value

	1988 street price	1993 used price	Percent of value retained
1 Gateway 386/16	$2950	$850	37.7
2 Toshiba 5200 (386-based portable)	$5950	$1500	36.5
3 Zeos 386/20	$3150	$900	36.0
4 AST Premium/386 Model 300	$3454	$950	34.5
5 Dell System 310	$4099	$925	31.4

In deciding whether to sell or keep an old PC, consider how much of your investment can be recouped. According to American Computer Exchange president John Hastings, three factors help a PC retain value—a respected brand name, industry-standard components, and a reasonable initial price. If your used system meets these criteria, it is a good candidate for resale. No-name PCs don't garner much on the used-PC market, Hastings says, and it's best to pass them on to other employees.

Source: American Computer Exchange, Atlanta, Georgia

FREE Coupon Book

SAVE $100s + ON LEADING BRANDS
MAG, NEC, Microsoft, Conner, Diamond, Orchid, Creative Lab, Teac, Impression, & More!

intel inside

"numero uno performer, taking first place"

PC WORLD BEST BUY — February 1993
PC WORLD BEST BUY — November 1992
PC WORLD BEST BUY — October 1992

COMPUTER SHOPPER
"looking for a fast computer you can trust, don't hestitate to order this one"

PC Magazine
"486SX/25 goes for high-powered, high-quality image--and succeeds."

32 Bit Local Bus!

Call for Configuration
$998
486SX/25

486DX 33MHz VL-B

Intel 486DX 33MHz
4MB RAM
VL-Bus VGA Card
VL-Bus IDE Controller
170MB Hard Drive
1.44 & 1.2 Teac Drive
101 Enhanced Keyboard
High Res Serial Mouse
15" SVGA Monitor
1 Year On-Site Service
MS Windows & DOS

$1795

486DX/2 66MHz VL-B

Intel 486DX/2 66MHz
4MB RAM
VL-Bus VGA Card
VL-Bus IDE Controller
170MB Hard Drive
1.44 & 1.2 Teac Drive
101 Enhanced Keyboard
High Res Serial Mouse
15" SVGA, Monitor
1 Year On-Site Service
MS Windows & DOS

$1995

30% Faster Graphics LOCAL BUS

486SX 33MHz VL-B
$1695

486DX/2 50MHzVL-B
$1895

All Prices & Specifications are subject to change without notice . Please call to confirm pricing, specifications and warranty details. All products and company names are trademarks or registered trademarks of their respective holders. The Intel Inside Logo is a trademark of Intel Corporation.

Coupon Package

Upgrade your new systems or existing ACMA System and save $100s of dollars with your coupons. The coupon must be sent in with order and this is a limited time offer.

MultiMedia Kits
NEC CD-ROM
Sound Cards
15" & 17" MAG Monitors
NEC Monitors
Networking Cards & Kits
FAX Modem
& More!

Acma® COMPUTERS, INC.

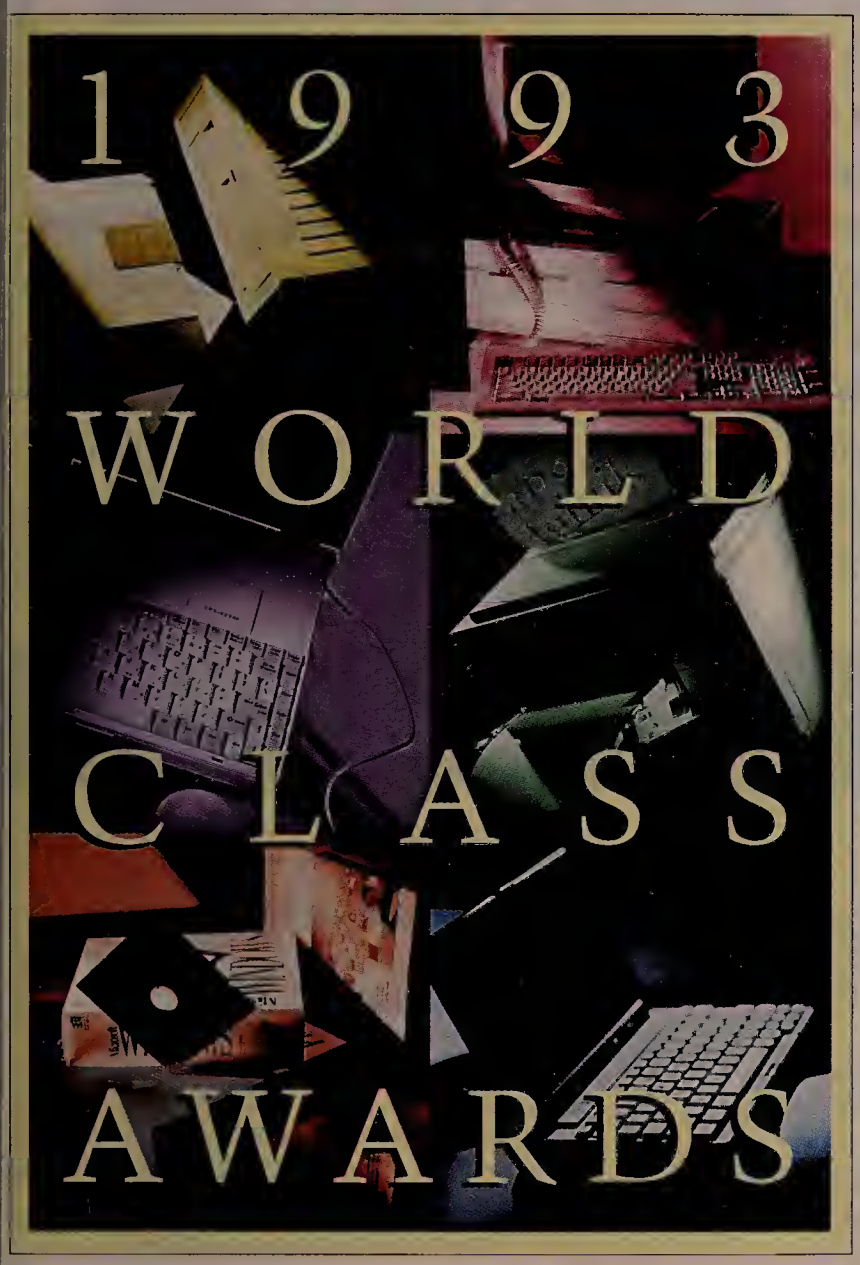
47988 Fremont Blvd., Fremont, CA 94538
(510)623-1212 FAX (510)623-0818

800-786-6888
Ext. 828

Circle 66 on reader service card

Each year PC WORLD's readers cast their ballots for the best hardware and software products on the market. Fill out your World Class Awards ballot this year and you'll also get a chance to

Win PRIZES WORTH $50,000



For a chance to win this year's top-rated hardware and software products, simply return your completed 1993 World Class Award ballot. And you may be one of three lucky winners to receive state-of-the-art prizes—worth nearly $50,000!

3 Grand Prize Winners

Take home the World Class winners! A selection of the winning products, from the top 486 desktop to the best spreadsheet package, will be awarded to our three grand prize recipients.

First prize: Power and productivity with the world's most popular 486 desktop system, laser printer, software collection, and more!

Second prize: Take your office on the road with the highest-ranked notebook, removable/portable drive, modem, software collection, and more!

Third prize: The heavy hitter in the lightweight category with the top-rated subnotebook, modem, software collection, and more!

Your opinion counts! And we'd like to thank you for it by automatically entering your name to win thousands of dollars worth of fantastic prizes. So let your voice be heard! Don't delay!

Guaranteed Prizes!
For Hundreds of Early-Bird Entries

Be one of the first 500 readers to send in your ballot before June 30, 1993 and get an exclusive *PC World* wrist and mouse pad combination. The ballot is postage-paid, so grab a pen and vote today! Tell us what YOU think...and we'll publish the results, along with YOUR photo and actual prizes YOU'VE won, in our December 1993 issue.

How to Enter

Voting is easy! Simply write the names of your favorite PC products on the official World Class Awards ballot attached, and return it to *PC World.* Fill out as many categories as you wish. The product receiving the most votes in each category will be designated a World Class Award winner.

By voting, you make yourself instantly eligible to win your share of prizes worth almost $50,000! Winners will be selected from a random drawing and notified personally by *PC World*'s editor-in-chief no later than November 1, 1993. Mail or fax your entry to *PC World* today!

First Prize **Winning super 486 desktop computer**
PLUS...the winning laser printer, sound board, CD ROM drive, fax-modem board, scanner, modem and pointing device, and your choice of 15 winning software packages. Estimated value $28,000!

Second Prize **Winning notebook computer**
PLUS...the winning ink jet printer, removable/portable drive, modem, and your choice of 10 winning software packages. Estimated value $14,000!

Third Prize **Winning subnotebook computer**
PLUS...the winning dot matrix printer, modem, extra battery pack, carrying case, and your choice of 5 winning software packages. Estimated value $8,000!

Category Descriptions: To help you cast your votes, we've supplied background information on product categories that may need additional explanation.

Hardware

Laptop/notebook computer: A battery-powered portable computer typically measuring 12 by 10 by 2 inches or smaller and weighing 6 to 10 pounds.

Subnotebook computer: A battery-powered portable computer typically measuring 5 by 8 by 2 inches or smaller and weighing less than 6 pounds; has usable touch-type keyboard.

Fax-modem board: An add-in card that lets you send and receive faxes and communicate with other PCs, on-line services, and BBS's.

Graphics accelerator board: A high-resolution video board that speeds up operations in Windows and other graphical applications.

Removable/portable drive: A hard disk drive that can be physically removed from your PC and used on another similarly equipped PC.

Pointing device: Mouse, trackball, light pen, digitizing tablet, and so on.

Most promising newcomer: Hardware released after December 1992 that you feel has had the greatest impact on personal computing.

Best service and support: The hardware company that provides the best service and support—considering cost, hours available, responsiveness, length of warranty, on-site repair, toll-free numbers, extended warranties, turnaround policy, and related services such as a customer BBS or on-line forum.

Software

Desktop publishing: Program used to produce high-quality newsletters, brochures, reports, magazines, books, and other publications.

Presentation graphics: Program used primarily for producing charts for business presentations.

Draw software: Program for creating drawings, highly detailed technical illustrations, graphics, and fine art.

Image-editing/paint software: Program for manipulating artwork and scanned photos as bit-mapped images, allowing you to edit, cut, paste, airbrush, and more.

OCR software: Program that converts characters on a scanned page into text.

CD ROM title: Any software in CD ROM format (i.e., applications, multimedia, encyclopedias and other references, and so on).

Accounting: Program that provides double-entry accounting capabilities. General ledger, accounts receivable, accounts payable, and other modules may be integrated in one package or available separately.

Personal finance: Program used to track personal expenses and income; does not include accounting packages (see previous).

Most promising newcomer: Software released after December 1992 that you feel has had the greatest impact on personal computing.

Best service and support: The software company that provides the best service and support—considering cost, hours available, responsiveness, length of warranty, toll-free numbers, extended warranties, and related services such as a customer BBS or on-line forum.

Other

Best mail-order company: Tell us which mail-order company you'd recommend when buying software and hardware—considering cost, technical support, on-site repair facilities, refund and return policies, and so on.

BBS/on-line service: Vote for the best electronic bulletin board or on-line service offering E-mail, specialized databases, interactive forums, public domain and shareware programs, and so on.

QUESTIONS?
Call 800/234-0455, and we'll be happy to assist you in completing your ballot.

PC WORLD 1993 World Class Awards Official Ballot and Entry Form

Dear Reader: Please use this official ballot and entry form to vote for products you are familiar with and would recommend, based on their performance and value. Choose only one product per category. **You don't have to vote in all categories to be eligible for the contest prizes.** Eligible products must be IBM PC compatible and commercially available as of May 1, 1993. To ensure accuracy, please supply (1) the manufacturer's name, (2) the name of the product, and (3) the model number for hardware or the version number—if applicable—for software. For Quickest Entry, Fax Your Ballot to *PC World* Today! 415/974-7404

Remember...the deadline to mail or fax your ballot is June 30, 1993! Only one entry per person, and all entries must be submitted on an official ballot and entry form. If you don't have an official ballot and entry form, you can get one by sending a stamped, self-addressed envelope to *PC World*, World Class Ballot Request, 501 Second St. #600, San Francisco, CA 94107. Please call 800/234-0455 with questions or for assistance in completing your ballot.

Name	Title	
Company		
Street		
City	State	ZIP
Daytime phone		
Please print or type all information		

HARDWARE	*Manufacturer*	*Name of Product*	*Model Number*	
Sample entry	XYZ Company	SuperPC 486SX	33	
Desktop computer				1
Laptop/notebook computer				2
Subnotebook computer				3
Laser printer				4
Dot matrix printer				5
Ink jet printer				6
Color printer				7
Monitor				8
Fax-modem board				9
Graphics accelerator board				10
Sound board				11
Hard disk drive				12
Removable/portable drive				13
CD ROM drive				14
Tape backup drive				15
Scanner				16
Pointing device				17
Most promising newcomer				18
Best service and support				19

SOFTWARE	*Manufacturer*	*Name of Product*	*Version Number*	
Word processing				20
Spreadsheet				21
Database (personal/professional)				22
Communications				23
Desktop publishing				24
Font package				25
Presentation graphics				26
Draw software				27
Image-editing/paint software				28
Operating system/environment				29
LAN operating system				30
LAN E-mail package				31
Fax software				32
Utility				33
Backup software				34
Forms software				35
OCR software				36
CD ROM title				37
Computer-aided design				38
Programming language				39
Project manager				40
Personal information manager				41
Accounting				42
Personal finance				43
Tax planning/preparation				44
Game				45
Shareware				46
Most promising newcomer				47
Best service and support				48

OTHER				
Best mail-order company				49
Best on-line service/BBS				50

93WC-LOT

Please detach ballot and mail today!

Guaranteed Prizes

to the first 500 readers who return their ballots to *PC World* before June 30 1993

Contest Rules

Entries must be postmarked no later than June 30, 1993. Each person may enter the contest only once. Type or print your choices on the official World Class Award ballot and entry form on the other side of this page. Your entry must include your name, address, and daytime telephone number. Employees of product manufacturers are eligible to vote for any products other than those sold by their companies; violators will disqualify their company's product. Employees of PC World Communications, Inc., their agents, and their immediate family are not eligible. Please tape the form closed (DO NOT staple) when mailing. Grand prize winners will be selected by random drawing from entries.

Your chances of winning are better than ever!

Fold here and mail today! Please tape; do not staple.

NO POSTAGE NECESSARY IF MAILED IN THE UNITED STATES

BUSINESS REPLY MAIL

First Class Mail Permit No. 22094 San Francisco, CA

POSTAGE WILL BE PAID BY ADDRESSEE

ATTN: *PC World* Research Department
1993 World Class Awards Ballot
501 Second St. #600
San Francisco, CA 94107-9833

LOTUS

GET THE MOST FROM 1-2-3 & COMPANION PRODUCTS

Taking Notes (Seriously)

Okay, why so much talk about *Lotus Notes*? Odds are less than 1 in 10 that you're using Lotus's information-sharing environment. Many of you are not hooked to a network at all.

But we're not describing *Notes* in detail just because Lotus is betting the company on it. We are taking a good look because *Notes* is a uniquely useful general-purpose tool that lets you solve business problems *with* other users.

No one has come up with a perfect definition of what *Notes* is and does. So let's use an analogy: *dBASE*, which brought the power of traditional databases to the PC. *Notes* is *dBASE* for information-sharing databases, and its reach could be even greater.

Could *Notes* help you out in your job? *Write us!* Drop me a line at 77 Franklin St. #300, Boston, MA 02110, or send a message via fax (617/426-0235), MCI Mail (583-1797), or PC World Online (EBENDER).

Eric Bender, Executive Editor

Add Graphics to Your Worksheet for Greater Impact

L6 *1-2-3*'s Graph Edit command provides a solid platform for presenting your data with charts, clip art, and other enhancements.

Presenting 1-2-3 . . . With Freelance

L13 Create professional-quality presentations of your spreadsheet data in a quick *Freelance Graphics* session.

Speed Your Planning and Forecasting

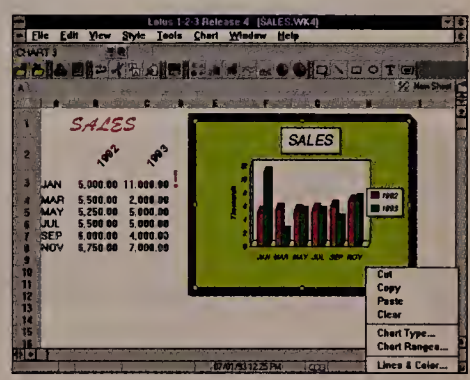
L19 Three simple macros help take the drudgery out of budgeting so that you have more time to concentrate on your financial objectives.

Notes 3.0 Brings More Power to the Group

L22 Lotus's information-sharing environment adds full-text searches, an all-*Windows* version, Macintosh support, and more capable development tools.

News

L2 Has Lotus finally cracked the code for a successful *Windows* spreadsheet? Beta users give a solid thumbs-up to *1-2-3 4.0 for Windows*' slick state-of-the-art interface and unmatched scenario-management features. "On day one, new users can understand the product," says an enthusiast.



Improving Your Skills

L29 Keep Track of Time in Your Worksheets

Macro Basics

L33 Let Users Know What Your Macro Is Doing

Advanced Macros

L35 File Commands Open New Doors for Data

Q&A

L39 Exclude Zeros, Convert Dates, Split Names

See page L10 for information about ordering Models on Disk, which includes models and other files from these articles.

Lotus News

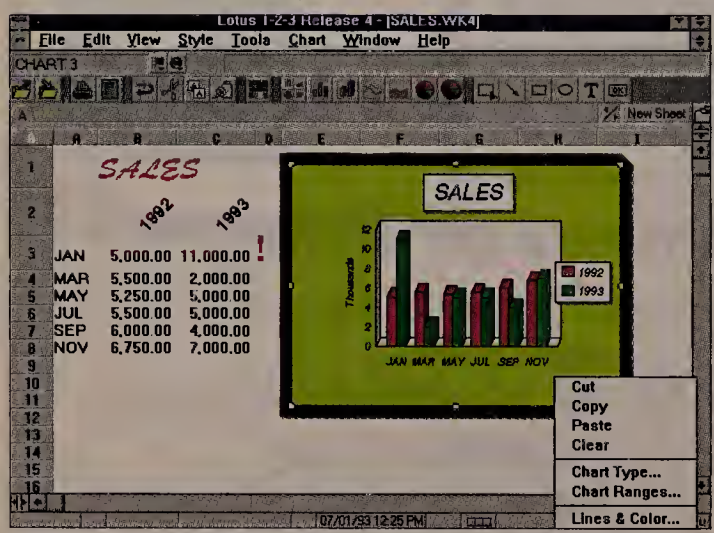
NEWS YOU CAN USE ABOUT 1-2-3 AND COMPANION PRODUCTS

1-2-3 4.0 Gains Acclaim for Ease of Use

If you bring home *1-2-3 4.0 for Windows* after it hits the streets in early June, the first thing to catch your eye will be a host of small interface improvements. You'll find on-screen chart editing, easy selection of rows and columns, in-cell editing, 3-D worksheets with tabs, and a "live" status bar that shows cell attributes. Beta users report that these enhancements make the new release a far friendlier and better behaved *Windows* product. (For more details on release 4.0, see the Test Drive in this month's *Top of the News*).

"WINDOWS SPREADSHEETS LIKE RELEASE 4.0 have become work environments unto themselves," notes New England Telephone's Colin MacKenzie, who gives high marks to the latest upgrade's friendliness.

Steven Frankel, senior vice president and director of research at Adams, Harkness & Hill, a Boston investment bank, says that these productivity aids will make his job easier and encourage the dozens of other financial analysts who work with *1-2-3* to switch to *Windows*. "We recommend that everyone use *Windows* applications wherever possible," Frankel says. With release 4.0, "the new usability features are good enough that we can begin to force the issue. On day one, new users can understand the product."



RELEASE 4.0'S ENHANCED SPREADSHEET-PUBLISHING FEATURES, including easy editing of charts right on the worksheet, draw favorable notice from beta users.

"*1-2-3* release 4.0 answers the charge [issued by *Microsoft Excel*]," agrees Colin MacKenzie, a network account manager at the New England Telephone Business Customer Service Center in Framingham, Massachusetts.

MacKenzie manages a network of 73 users. His department is scheduled to move entirely to *Windows* and *Lotus Notes* later this year; employees have been running either *1-2-3 3.1+* or *1-2-3 for Windows 1.1*.

MacKenzie gives resoundingly high marks to release 4.0's new ease of use as well as its increased adherence to *Windows* conventions. "Release 1.1 was too busy, too cluttered," he says. "They've cleaned up the screen a lot." Like Frankel, MacKenzie says he believes that DOS users will find it easier to upgrade to release 4.0 than to release 1.1. "Once users get the concept of what *Windows* does, they don't want to have to unlearn anything. You can't underestimate that incremental ease of use."

After limited testing with some macros and small applications written in previous versions of *1-2-3*, MacKenzie adds, he finds that he is comfortable with release 4.0's compatibility.

Pluses for Spreadsheet Publishing

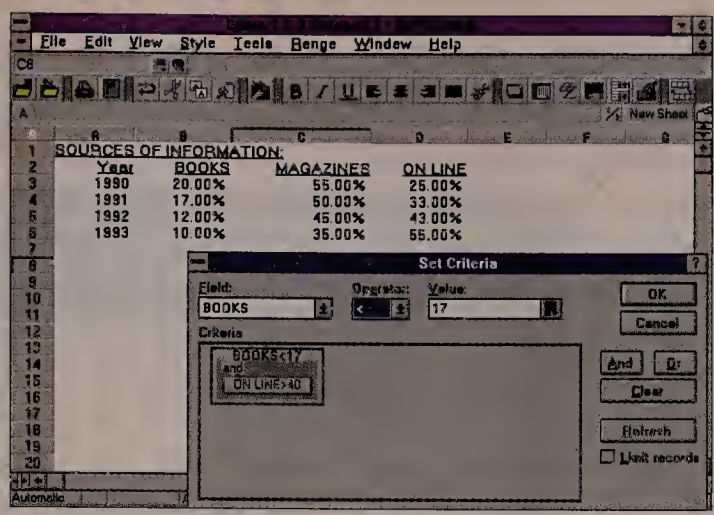
Early evaluators agree that the upgrade's spreadsheet publishing features win the award for "most improved." Users no longer need to open a separate window to create and edit charts, and a "draw layer" allows them to annotate worksheets with text, arrows, and lines. Frankel, who says that every worksheet his company produces must be of presentation quality, formerly exported worksheets to *Freelance Graphics* for further embellishment. "Now I can do those kinds of things right in *1-2-3 for Windows*."

Additionally, Frankel likes the ability to rotate text and the increased number of chart types, although, he says, "plenty of chart options could still be added." He also

likes being able to select and edit individual elements of a chart on screen, but he's disappointed release 4.0 still doesn't share a draw engine with *Freelance Graphics*.

For MacKenzie, publishing is at the core of his spreadsheet work. "We bring in data from external databases and graph it in *1-2-3*. Live charting puts the capability where it should be, right inside the spreadsheet." His division often exported worksheets listing telephone installation and repair rates to Software Publishing's *Harvard Graphics* for polishing. Now users can get similar results without leaving *1-2-3*.

MacKenzie also welcomes release 4.0's Data Query Assistant, which provides menu-driven access to a host of *dBASE* files. "*Windows* does most of the work," he explains. "Users can see a visual representation of where they are, and those little cues make a huge difference [in understanding the query process]." However, he'd like to have the option of being prompted through the process step-by-step.



THE DATA QUERY ASSISTANT provides menu-driven access to both internal and external databases. "Users get a visual representation of where they are," says New England Telephone's MacKenzie. Those clues are a big help in understanding the query process.

Slow Shift to Version Manager?

Release 4.0's most distinctive new feature is Version Manager, which allows a user or a work group to manage multiple versions of data within a single worksheet. The Version Manager "is a big win for me," Frankel says. "People can now go out and use their own assumptions [in a shared worksheet]."

Early adopters say that Version Manager is likely to gain advocates throughout an organization, but this will happen slowly. Not every new release 4.0 user will want to explore Version Manager's complexity, but Frankel expects that situation to change—particularly as users learn that they can work concurrently on the same live file via links to *Notes*.

Version Manager's acceptance "will be slow at first, though I personally see a lot of circumstances where I could build month-over-month or region-over-region scenarios," states MacKenzie. "But then use will pick up exponentially." This shift will reflect the mind-set of the traditional *1-2-3* user, he says. "People still think of spreadsheets as doing number crunching. But now we are seeing that *Windows* spreadsheets like release 4.0 have become work environments unto themselves." **—Tracy Mayor**

Tracy Mayor is a freelance writer in Boston.

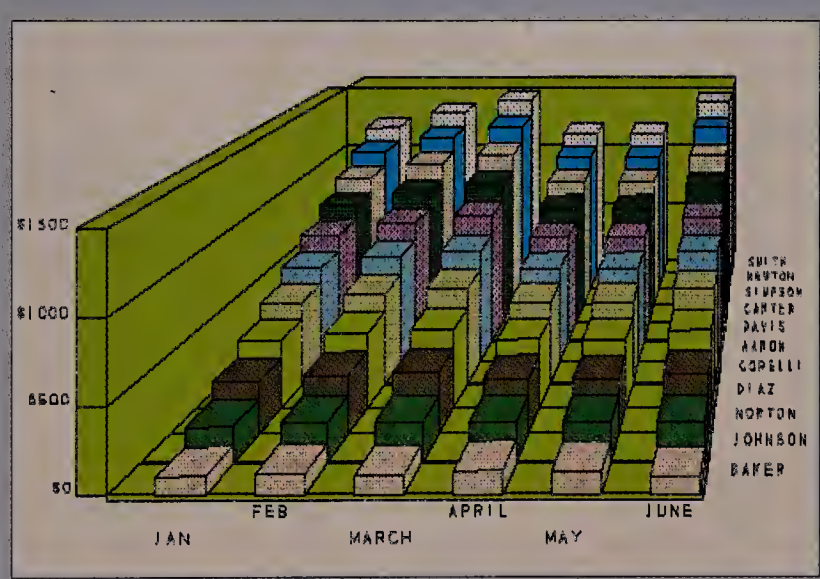
▶ **Coming in July:** *PC World Lotus Edition*'s experts provide an in-depth special report on what *1-2-3 4.0 for Windows* promises for users—and how well it delivers.

JUST RELEASED

UltraGraphics **offers a host of advanced charting capabilities for *1-2-3* release 3.1 or higher and *1-2-3 for Windows 1.x*. The add-in package provides a dozen 2-D and 3-D charts (such as the 3-D stacked bar chart shown at right) plus automatic range selection, 360-degree rotation, automatic scaling along all three axes, "live" charts that are updated automatically when worksheet values change, charts with up to 24 columns by 30 rows of data, and other options.**

UltraGraphics **comes in DOS and *Windows* versions, each of which needs about 2MB of memory beyond the standard spreadsheet requirements. The *Windows* version lets you send graphs via DDE links directly to any application that accepts the *Windows* metafile format. *UltraGraphics* is available for $159.95 plus $5 shipping from Intex Solutions (617/449-6222).**

Reader service no. 710



High Loader **lets users of *1-2-3* releases 2.2, 2.3, and 2.4 overcome memory shortfalls by loading add-ins, macro libraries, Wysiwyg fonts, and worksheet data into otherwise-unused upper memory. (While release 2.*x* taps only 640K of conventional DOS memory, 198K or more upper memory may still be available if your system's total memory is 1MB or greater.)**

High Loader **requires the DOS 5.0 memory manager or one of the supported third-party memory managers (including *QEMM386 5.0, 386MAX 7.0, BlueMax 5.12, Netroom 2.20, QRAM 2.0, Memory Commander 3.04*, and later versions of all these packages, as well as other products that support the XMS protocol). The package takes only 7K of conventional memory. You can download *High Loader* from the CompuServe LOTUSA forum and other on-line sources for a $29 shareware registration fee, or you can order it for $34 plus a $5 shipping charge from Lerman Associates (508/692-7600).**

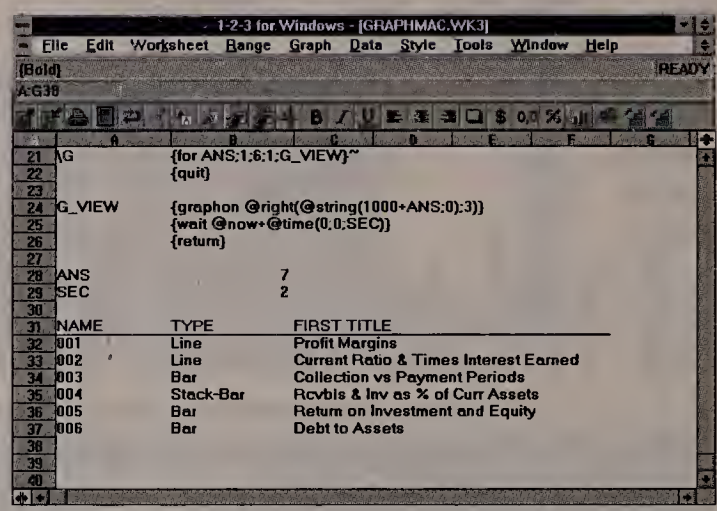
Reader service no. 711

SmartMacros and SmartSheets Debut

Not yet tired of talking *Smart*, Lotus has developed two more *1-2-3* add-ons under that name: *SmartMacros*, a collection of general-purpose and utility macros that can be incorporated into larger macro code, and *SmartSheets*, a group of blank forms to help run your business and handle your personal finances.

The *SmartMacro* package delivers triple benefits. First, the documentation teaches you how to write *1-2-3* macros. Second, the software provides 58 macros that help you navigate a worksheet, manage and format your data, format dates, change your display, manage your files, print your data, and work with graphs. Finally, you get code that you can adapt to build data entry applications, plus 6 helpful utility macros.

SmartSheets contains 52 forms in three categories: Business Reporting and Analysis, Sales and Operations Management, and Personal Finance and Planning. Generally, the spreadsheets are blank templates that you use to create general business forms to send to customers or suppliers. The personal finance forms perform some simple analyses. The general-purpose *SmartSheets* such as the invoice and the fax cover sheet can save you the time and trouble of having to design the forms yourself. And if you're familiar with *1-2-3*, you should be able to adapt these forms to your own applications.



THIS SMARTMACRO PRODUCES ON-SCREEN GRAPHS of financial ratios developed from data elsewhere in the sheet. You can adapt the concept to create screen shows.

SmartMacros lists for $69.95 but is available from Lotus Selects (800/635-6887) for $39.95. *SmartSheets* is priced at $59.95 and comes from Lotus Selects for $39.95. The packages require *1-2-3* release 2.3 or later, *1-2-3* release 3.1 or later, or *1-2-3 for Windows*. **—Andrea Powers**

LETTERS

Congratulations

As a longtime subscriber to the former *Lotus* magazine, a longtime user of *1-2-3*, and a member of the Boston Computer Society's Lotus Group, I recently read and enjoyed the new *PC World Lotus Edition*. I want to congratulate you on this successful transition. You retained the core of *Lotus* magazine within the new format.

John Thompson, Braintree, Massachusetts

Underwhelmed and Outraged

Lotus magazine will be sorely missed. Its death is a tragedy. I'm underwhelmed and outraged by your latest issue of *PC World Lotus Edition*. It's atrocious the way you have killed an excellent magazine. Daily I pull out issues of *Lotus* magazine going all the way back to 1985 to teach someone how to use a database, or write macros, or any one of a hundred other things. Fortunately I have my reference magazine to go back to, since it doesn't look like I'll have anything to look forward to. Future training needs and ongoing education will have to be met from the past, or perhaps someone else will come out with a good magazine for the millions of *1-2-3* users who want to keep their skills honed and challenged.

Darrell K. Risley, Pacific, Missouri

Include Me Out

I suscribed to *Lotus* magazine for some time and completely enjoyed it. I had to learn the little I am proficient at on my own, so *Lotus* was a big help. But now that you have combined *Lotus* with *PC World*, you can count me out. When my subscription expires, I will not renew.

As far as I am concerned, you took a perfectly readable and enjoyable magazine and turned it into a cumbersome catalog of advertising and information entirely uninteresting to me. Thanks, but no thanks.

Pamela Allabastro, Glenview, Illinois

Happy or Sad?

When I received notification some months back that my subscription to *Lotus* was to be switched to *PC World*, I didn't know whether to be happy or sad. I can now tell you without reservation that I am delighted.

The *Lotus* section of each of your issues is even better than what I remember of *Lotus* magazine. It is clearly written, includes useful tips, and appears to embrace all levels of interest from the beginning *1-2-3* user to the more advanced macro writer.

Paul Arrowood, Weston, Connecticut

Insert Response

I don't (INSERT) mind the fact that (INSERT) *Lotus* (INSERT) magazine is now part (INSERT) of *PC* (INSERT) *World*. Both are great (INSERT) magazines. What I (INSERT) do mind is all the inserts for advertisements.

Francis X. Carroll, Horsham, Pennsylvania

Mail your reactions, responses, and ideas to Letters, PC World Lotus Edition, *77 Franklin St. #300, Boston, MA 02110, or send them electronically via fax (617/426-0235), MCI Mail (583-1797), or to EBENDER on PC World Online. Include your name, city, state, and phone number. We reserve the right to edit letters.*

PC World Lotus Edition *Models on Disk*

Yes, start sending me Models on Disk each month for a full year at the special rate of only $89.95, and I'll receive a bonus month FREE with my paid subscription!

SAVE 30%

☐ Send me .....disk only (indicate month) ($9.95)

☐ Payment enclosed (U.S. funds only) ☐ MasterCard ☐ VISA ☐ American Express

Disk size ☐ **3.5 in.** ☐ **5.25 in.** ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐ Exp. Date ☐☐☐☐

Signature .....

Name .....

Company .....Phone ( ) .....

Address .....

City,State,Zip .....

Money-Back Guarantee: If you aren't fully satisfied with PC World Lotus Edition *Models on Disk,* just tell us. We'll immediately refund the unused portion of your disk subscription.

Please allow 4-6 weeks for delivery of first disk. All orders must be prepaid in U.S. funds. Canadian orders please add $10 per subscription or $2 per individual disk for postage and GST. Foreign (airmail) orders please add $30 per subscription or $4 per individual disk. CA, MD, GA, IL, MA, NJ, TX residents add applicable sales tax.

4UA3

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS MAIL PERMIT NO. 604 SALISBURY, MD

POSTAGE WILL BE PAID BY ADDRESSEE

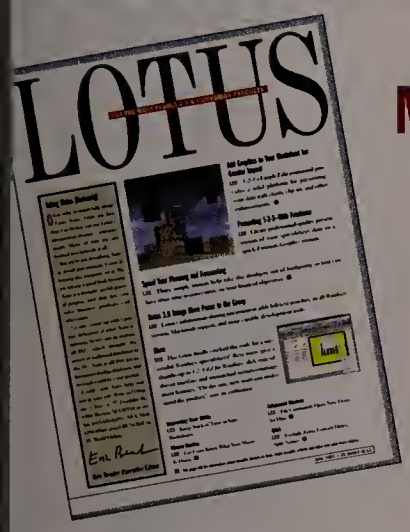
PC World Lotus Edition *Models on Disk*

P.O. Box 1743
Salisbury, MD 21802-9830

What's the easiest way to maximize your Lotus productivity?

Models on Disk

Save 30%



MODELS ON DISK compiles the macros, applications, formulas, and utilities drawn from the pages of PC World Lotus Edition, eliminating the tedious job of building your own worksheets keystroke by keystroke.

Easy as @Pi

Each month you'll receive a disk filled with the tips, tactics, and productivity strategies that are published in the articles of PC World Lotus Edition. Open the file of the model described in the magazine, and import it to your worksheet. What could be easier?

Do More by Doing Less

Here are just a few of the hundreds of subjects covered by *Models on Disk:*

• 1-2-3 Macros: Menu Mania • Financial Analysis With Style • Find Duplicate Records • How to Build a Better Forecast • Great Wysiwyg Macros • Calculating a Mortgage Balance • and many more!

Guaranteed satisfaction. Give *Models on Disk* a try. If you're not completely convinced that it's the easiest way to maximize your Lotus productivity, you can cancel your subscription at any time and we'll immediately refund the full value of your remaining service — no questions asked.

Individual Models on Disk

Single disks are available for only ~~$14.95~~ *$9.95!* Call 1-800-824-5520 to order, or have a complete list of all available disks sent to you.

Look for this icon in PC World Lotus Edition to see which models are included on each month's disk.

Save Time...Save Money Special Subscription Offer

Receive 13 disks for the price of 12: just ~~$129.35~~ *$89.95!* That's over 30% off the $9.95 single disk price (equal to four FREE disks a year!)

Subscribe Today!
1-800-824-5520
(VISA, MasterCard, and AMEX accepted.)

FREE BONUS DISK

Outside North America, please call 1-410-546-0191. PC World Lotus Edition *Models on Disk,* P.O. Box 1743, Salisbury, MD 21802-9830.

5
150
100
50
0
1000
千円
ZEHN
DEUTSCHE MARK
10
DEUTSCHE
BUNDESBANK
MDCCLXXVI
JAN
FEB
MAR
APR

Add Graphics to Your Worksheet for Greater IMPACT

By Kelly R. Conatser

In the competitive business world, a spreadsheet presentation without graphs just doesn't cut it. Fortunately, there's Wysiwyg, which comes with *1-2-3* releases 2.3, 2.4, 3.1, 3.1+, and 3.4 as an add-in, which is built into *1-2-3 for Windows*.

Wysiwyg lets you create attractive graphs from your *1-2-3* data, place them in the worksheet, and then enhance and print them. Other commands in Wysiwyg's extensive repertoire let you import clip art and even create your own pictures. Wysiwyg gives you many of the drawing and charting capabilities found in stand-alone graphics packages that cost $300 and more.

In "Do the Right Graph" (February 1993), we outlined the rules for building effective visual presentations. In this article, we'll show you how to use Wysiwyg's :Graph menu to enhance and print a graph, and how to spruce up a worksheet with a clip art image. We'll also present some tips and techniques that you can use to create your own *1-2-3* drawings. We'll assume you're using a mouse to perform these commands, and we'll concentrate on the commands in DOS versions of *1-2-3* or in *1-2-3/W*'s classic Wysiwyg menu.

Creating Basic Graphs

Luckily, Wysiwyg's most powerful graphing command, :Graph•Add, is also its simplest. After you've created a graph with the /Graph command, you can place it in the worksheet, where it is automatically updated each time you change its underlying data. You can also enhance the graph by adding explanatory text, arrows, and geometric shapes, and by changing the colors of one or

1-2-3's Graph Edit command provides a solid platform for presenting your data.

ROB DAY

Crawley Co.

Sales Exceed Projections for the First Time Since '87

Fiscal Year Data

Year	Projected Sales	Actual Sales	Variance
1986	300	422	40.7%
1987	350	374	6.9%
1988	400	315	-21.3%
1989	300	237	-21.0%
1990	200	191	-4.5%
1991	175	168	-4.0%
1992	250	332	32.8%

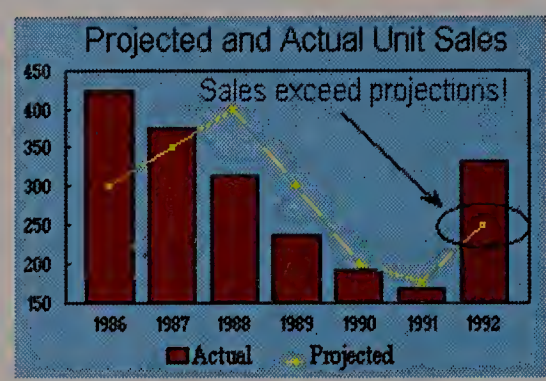


FIGURE 1 (above): HIGHLIGHT TRENDS IN YOUR DATA by including a Wysiwyg graph in your worksheet. If you change one of the numbers, the graph is automatically updated.
FIGURE 2 (left): CLIP ART CAN ENHANCE any worksheet. The pot of gold was imported using the command :Graph • Add • Metafile.

more of the graph's components.

FIGURE 1 shows how such a graph looks in a worksheet. To create the graph shown in the figure, first follow the instructions in the setup box to enter the sample labels and data. Then select */Graph•Type•Mixed*, select *X*, and specify range A10..A16. Select *A* and specify range C10..C16. Next, select *D* and specify range B10..B16. Select *Options•Titles•First* and enter **Projected and Actual Unit Sales**. To make the graph more meaningful, select *Legend•A* and enter **Actual**, then select *Legend•D* and enter **Projected**. Finally, select *Quit•View* to see the graph in full-screen mode.

The mixed graph you've just created depicts two data sets for Crawley Company, a small construction firm. The line represents the company's projected unit sales, the bars its actual unit sales. The mixed graph lets you grasp the trends in both data sets at a glance, and it tells you exactly when actual sales exceed projected sales.

But this graph would be even more valuable if it appeared next to the data on which it is based. Let's add it to the worksheet. Press any key to return to the main Graph menu, then select *Quit*. Next select *:Graph•Add•Current*. Since you just created this graph, it's the current graph. If you had created and named other graphs, you'd select *:Graph•Add•Named* and enter the graph name. Indicate range F7..I17 and press **<Enter>** to draw the graph in the worksheet. To see how the graph is automatically updated, select *Quit* from the menu and change a few numbers in range B10..C16.

Editing the Graph

The graph still needs a few enhancements. For this, use the Wysiwyg Graph Editor, a full-screen window with its own menu.

There are two ways to access the Wysiwyg Graph Editor: You can select *:Graph•Edit* and specify any cell the graph occupies, or in DOS versions of *1-2-3*, you can simply double-click the mouse on the graph (in *1-2-3/W* if you double-click the mouse on a graph, *1-2-3/W*'s Graph menu appears, not Wysiwyg's). Try either approach. Most of the commands we describe are located on the :Graph Edit menu and work with either the keyboard or the mouse. We'll use the mouse.

Graph Editor's Add command lets you spice up graphs with lines, arrows, and drawings.

The most obvious difference between your graph and the one in Figure 1 is the extra text. The Add•Text command in Wysiwyg's Graph Editor lets you add text anywhere in a graph. Try this now: Select *Add•Text* and enter **Sales exceed projections!** Move the mouse to place the text in approximately the same position shown in the figure, then click the mouse. Use the Edit•Text and Edit•Font commands to edit the text or to change its font.

You can also use the Graph Editor's Add command to place lines, arrows, geometric shapes, and freehand drawings in a graph. To add the arrow shown in Figure 1, first select *Add•Arrow*, use the mouse to place the cursor under the graph title, and press **<Space>** or click the mouse once. To complete the arrow, place the cursor where you want the arrowhead to appear, and press **<Enter>** or double-click the mouse. To create the ellipse under the arrowhead, select *Add•Ellipse* and move the cursor to the left side of the ellipse. Hold down the left mouse button and stretch the box. Surround the data point with the box and release the mouse button.

After you draw an object, one or more small boxes—or selection handles—appear around it. To move the object, either select *Rearrange•Move* or click the mouse on one of the selection handles and drag the object where you want it. If the object you want to move isn't selected, just click it to make the selection handles appear. To delete an object you've created, select *Rearrange•Delete* and specify the object.

After you make two more alterations, the graph will be complete.

First, if you're using release 3.*x*, change the size of the numbers on the *x*- and *y*-axes and the size of the text. Select *Options•Font-Magnification*, and enter a magnification factor of **175**. If the numbers and text now look too big, try a magnification number between the default of 100 and the 175 that you just tried.

Now, let's change the color of the text 'Sales exceed projections!'. Click the mouse to select the text, select *Color•Text*, and then select *Dark-Blue* from the list that appears.

We also want to give the graph a background color that will make it stand out from the white worksheet background. Select *Color•Background*. Wysiwyg presents you with its palette of 224 colors instead of the basic 8-color palette you get for text objects. With the arrow keys (the mouse doesn't work here), move the cursor onto a color (in our example, pick a shade of blue),

press **<Enter>**, and then select *Quit* to return to the worksheet.

Making a Better Fit

If a graph you've created looks squeezed or stretched or too big or too small, you don't have to erase and redraw. Instead, just select *:Graph•Settings•Range.* When *1-2-3* prompts you for the graph to resize, place the cell pointer somewhere in the graph's current range (or enter the graph name if you've assigned one), and press **<Enter>**. Then indicate the new range the graph should occupy. You can repeat this process until the graph is just right. You can also remove a graph from the worksheet, either permanently or temporarily. To get rid of a graph for good, select *:Graph•Remove* and specify the graph name or a cell in the range that contains the graph. To remove a graph temporarily, select *:Graph•Settings•Display•No* and specify the graph you want to hide. This option is helpful if you're using a slow computer, because Wysiwyg doesn't have to redraw the graph each time you change the worksheet. This command shades the graph area, a helpful reminder that this range is already taken in your worksheet. To redisplay the graph, select *:Graph•Settings•Display•Yes* and specify the graph.

To save this worksheet with the graph you've created and edited, select */File•Save* (*File•Save As* in *1-2-3/W*). In all releases except *1-2-3/W,* make sure you save this worksheet with Wysiwyg attached. Wysiwyg will create a format file (FMT in release 2.*x*, FM3 in release 3.*x*) that will be loaded automatically the next time you retrieve this file with Wysiwyg attached. *1-2-3/W* always saves an FM3 file, which includes any Wysiwyg formatting that you've created.

Displaying Other Graphics

Wysiwyg does more than display graphs of worksheet data. You can display images saved in a special format called computer graphics metafile (CGM). *1-2-3* releases 2.3, 2.4, 3.1+, and 3.4 include several CGM files, and commercially available packages offer hundreds.

FIGURE 2 shows how one of many CGM files can enliven your worksheet. The pot of gold is from the POTGOLD.CGM file, which comes with *1-2-3* releases 2.4 and 3.4. (If you're using release 2.3, 3.1, or 3.1+, choose a different metafile.) To add this metafile to your worksheet, first move the text in range A2..A4 to range C2..C4. Then select *:Graph•Add•Metafile,* select the file *POTGOLD.CGM,* indicate range A1..C4, and select *Quit.*

When you add a metafile to this worksheet, part or all of the worksheet headings in range C2..C4 seem to disappear. That's because the CGM file occupies range A1..C4, and Wysiwyg assumes that all images you add to the worksheet—graphs or graphics—are opaque. To make the pot-of-gold graphic transparent, select *:Graph•Settings•Opaque•No* and indicate any cell in the graphic. The text in range C2..C4 shines through.

Once you have imported a graphic metafile into the worksheet, you can modify or enhance it with the Wysiwyg Graph Editor, just as we did with the graph in range F7..I17. Just double-click the image, or select *:Graph Edit* and indicate a cell that the image occupies. Most clip art images don't require many—or any—modifications. However, adding a color background can sometimes sharpen the effect you get with clip art. Keep in mind that depending on which release of *1-2-3* you use, adding a background color to your graphic with Wysiwyg's :Graph•Edit•Color•Background command may nullify the Opaque•No setting, hiding your worksheet data underneath the graphic.

Create Your Own Clip Art

Specialized graphics packages, such as *Freelance Graphics* and *Harvard Graphics,* offer several tools and templates that help you create your own drawings.

Wysiwyg's Graph Editor also lets you create original works of art, although it reaches its limits pretty quickly. It works best for images that are composed almost entirely of lines and simple geometric shapes. And even for these kinds of drawings, be forewarned: This is not a task for people short on patience or mouse skills.

To create a drawing in the Graph Editor,

9 Tips for Enhancing Images

Here are nine tips to help you enhance a Wysiwyg graph or an imported CGM image.

1 To create a circle, select *Add • Ellipse* and hold down the <Shift> key as you draw the ellipse. To create a square, select *Add • Rectangle* and hold down the <Shift> key as you draw the rectangle.

2 To select a geometric shape for editing, click near the edge of the object. Clicking near the middle of the object doesn't always select it.

3 To change the width of a line or of the edge of a geometric shape, select *Edit • Width* and choose the width you want.

4 To restore the last object you deleted in the drawing, use the *Rearrange • Restore* command.

5 To create several copies of the same object, create the first object, select *Rearrange • Copy* to copy the object, then drag the copies to their correct places in the drawing.

6 To align objects, select *Options • Grid • Yes* to display a grid over the graph-editing area.

7 To prevent one object from obscuring another, select the object that's in the way, then choose *Rearrange • Back.* This places the selected object at the back of the picture, so any overlapping objects appear to be in front of it.

8 To select several objects at once, click the background of the graphic so no object is selected. Then hold down the <Shift> key, drag the mouse around the objects you want to select, and release the mouse button. The selected objects now act as a group. Any editing that you do (such as changing the inside color) will apply to all the objects in the group, and you can move all the objects together by dragging one of them. To disband the group, click on a single object or on the background of the drawing.

9 To protect your objects from being edited or moved, select *Rearrange • Lock,* then select the object or objects you want to protect. To turn protection off, select *Rearrange • Unlock* and indicate the object or objects to be unlocked.

you need a blank canvas, which you create within the worksheet. Select *:Graph•Add•Blank*, indicate the worksheet range you want your completed graphic to occupy, and select *Quit*. (Later you can use Wysiwyg's Graph•Settings•Range command to resize the graphic in your worksheet.) Once you've made way for your masterpiece, double-click the blank graph (In *1-2-3/W*, select Graph•Edit) to access the Wysiwyg Graph Editor.

You're ready to start drawing. Most of the elements that comprise your drawing will be the lines, polygons, rectangles, and ellipses available on the Graph Editor's Add menu. After you add a geometric shape, you can change the color of its border by selecting *Color•Lines*, of its interior by selecting *Color•Inside*, or of its backdrop by selecting *Color•Background*.

When you select one of these commands, the Graph Editor presents the full Wysiwyg color palette. Although the colors that contain dot patterns and hatching are usually distracting in business graphs, they can add texture to your original drawings.

Creating a line or a polygon can be somewhat annoying, because the Graph Editor doesn't know when you want to stop drawing the current object and move on. When you click the left mouse button, the Graph Editor completes the current line segment and assumes you want to draw another one, which quickly leads to four-legged triangles and other strange apparitions. To put a stop to this tangle of line segments, just double-click the mouse or press **<Enter>** to complete your line or polygon.

When you create a polygon, worry about its proportions first and its size and position later. If a polygon must be of exact proportions (as with an isosceles triangle), use the *x* and *y* coordinates that appear in the upper-left part of the screen. You can also align a polygon's side to the nearest 45-degree increment by holding down the **<Shift>** key as you anchor the point.

After you've created a geometric shape with the proportions you want, resize it by selecting *Transform•Size*. This command is a little tricky, because as soon as you select it, the mouse pointer changes to a bounding box that controls the size of the object. As you move the mouse, the bounding box changes, indicating the size the object will take if you press the left mouse button. To leave the object at its original size, press **<Esc>** or click the right mouse button.

Unless you are blessed with true artistic ability or coordination, better not rely too heavily on the :Graph•Edit•Add•Freehand command. Expressing yourself with several short strokes is best. If one stroke doesn't fit in, you can select and delete it with the Rearrange•Delete command, without ruining the rest of the drawing.

Kelly R. Conatser is a contributor to PC World Lotus Edition *and a consultant in spreadsheet application development.*

Models on Disk includes the models, macros, and formulas contained in this article. To order, call 800/824-5520 or write to *PC World Lotus Edition*, Models on Disk, P.O. Box 1743, Salisbury, MD 21802-9830. Individual disks are $9.95. A full year's subscription is $89.95. This material is also available on CompuServe and from PC World Online; see page 10 for more information about PC World Online.

BUILDING THE SAMPLE GRAPH

This model works in *1-2-3* releases 2.3, 2.4, 3.1, 3.1+, and 3.4 with Wysiwyg attached, and in *1-2-3 for Windows*.

1. Attach Wysiwyg

In *1-2-3* release 2.*x*, select */Add-In•Attach* and select *WYSIWYG.ADN*. Then select *No-Key•Quit*.

In release 3.*x*, press **<Alt>-<F10>**, select *Load*, and specify *WYSIWYG.PLC*. Then select *No-Key•Quit*.

2. Column widths

Column	Width
A	6
C	8
E	3

For example, to set the width of column A, place the cell pointer in column A, select */Worksheet•Column•Set-Width*, and enter **6**.

3. Cell formats

Assign the Percent•1 format to range D8..D15: Select */Range•Format•Percent*, enter **1**, and indicate range D8..D15.

4. Labels

Enter the labels in range A8..D9 of Figure 1. Enter the three long labels at the top of the figure in cells A2, A3, and A4. Assign the Swiss 24 font (also known as Arial 24 font and found as font 3 in most font libraries) to the label in cell A2, and assign the Swiss 14 font (font 2 in most font libraries) to the label in cell A3.

For example, to assign the Swiss 24 font to the label that appears in cell A2, select *:Format•Font•3* and indicate cell A2. (This will work unless you've changed the default settings in your font library. In that case, you must use the *Format•Font•Replace* command to put the Swiss 24 font back in your font library.)

5. Fonts

To assign the boldface attribute to the labels, select *:Format•Bold•Set* and indicate range A2..A4. Then select *:Format•Bold•Set* and indicate range A8..D9. To create the solid lines, select *:Format•Lines•Bottom* and indicate range A9..D9. Repeat this command for range A16..D16.

6. Label alignment

To center the three labels that appear at the top of the worksheet, select *:Text•Align•Center* and indicate range A1..I4. To right-align the labels in range A8..D9, select */Range•Label•Right* and indicate range A8..D9.

7. Values and formulas

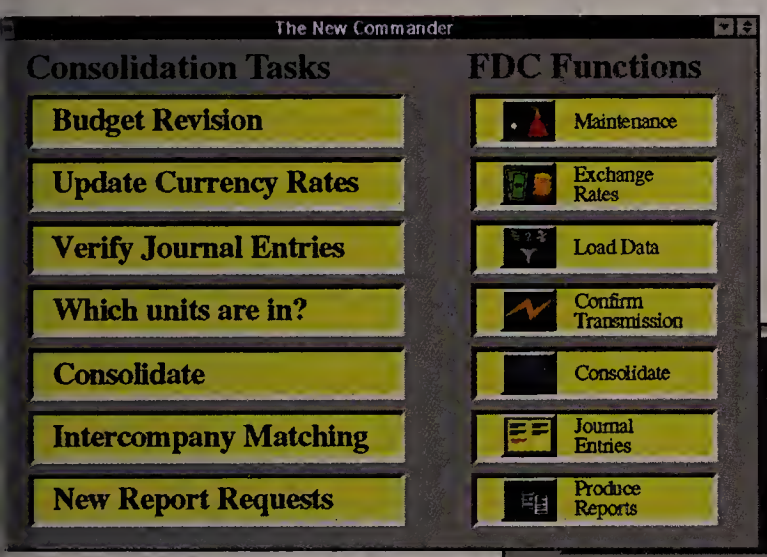
Enter the values in range A10..C16. Enter the formula **(C10-B10)/B10** in cell D10 and copy it to range D11..D16. To enhance any negative variances in column D, select *:Format•Color•Negative•Red* and specify range D10..D16.

Consolidate with Confidence

with The New Commander™ FDC

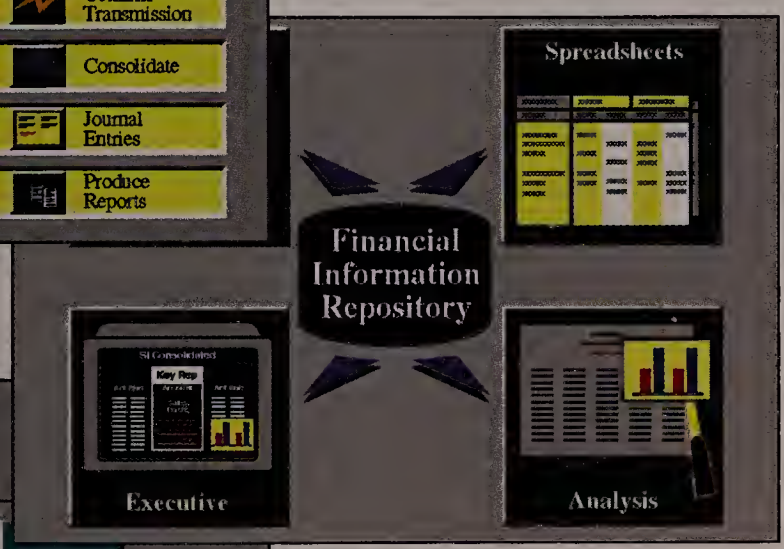
PC/LAN-based Software for Financial Data Consolidation and Reporting

Commander FDC—unlike spreadsheets and GLs—is designed to handle the unique logistical and accounting demands of collecting, consolidating and reporting financial data for multidivisional, multinational corporations, so you can be confident about the information it provides. You can shorten your closing cycle, improve your staff's productivity, and even save money, because it runs on a cost-effective PC/LAN.



Automatic, accurate consolidation

Perform complex consolidation tasks such as data collection, currency translations, intercompany eliminations, re-statements, adjustments and journal entries simply and automatically—without rekeying data. Close your books more quickly, and more accurately, with Commander FDC 's built-in accounting intelligence, data integrity requirements, and audit trails.



An integrated repository of financial information

Commander FDC lets you easily integrate information from multiple general ledger systems, automatically accommodating account structure differences. It creates a controlled central repository of diverse financial information—actuals, budgets, forecasts—for easy analysis and integrated reporting. It includes flexible reporting tools, or lets users access data using Lotus or Excel.

Flexibility for your changing needs

Commander FDC lets you respond to change—in your organization, in account structures and in report formats. It also handles the complexities of comparative reporting after changes have been made. It supports the information needs of both corporate headquarters and the reporting units, easily adapting to different organizational structures, reporting requirements and accounting systems. And it can easily expand to include enterprise budgeting, EIS/MSS and other managerial applications.

See for yourself...

For a copy of a white paper on *Financial Reporting Comes of Age*, call Chris Kelly at **1-800-922-7979,** Canada: 1-800-541-1780, or 313-994-4800

COMSHARE®

Specializing in Managerial Applications™

Winner of the 1992 ITAA Customer Support Quality Award

© 1992, Comshare, Inc. Commander is a trademark of Comshare, Inc. C93-7
All other tradenames mentioned are property of their respective owners.

For free product information, circle 85 on the reader service card on page 279

BRILLIANT SOLUTIONS

Undocumented features. Powerful applications. Unique shortcuts. Quick tutorials. Answers to most commonly asked questions.

LOTUS BOOKS

SOLUTIONS FROM THE SOURCE

Only *LOTUS BOOKS* are produced in close collaboration with the software experts at Lotus Development Corporation. Written clearly and concisely in plain English, at least one of these guides will be invaluable when you need it most. *Order today!*

THE DEFINITIVE HANDBOOKS -

THE LOTUS GUIDE TO 1-2-3, RELEASE 2.4, by Daniel Gasteiger and Nick Delonas. Get a complete update on all the new features of Release 2.4, including goalseeking with the Solver, SmartIcon toolbars, and new printing techniques. Engaging tutorials will help you master all of these new features and more. This definitive guide also provides a thorough discussion of 1-2-3's data analysis tools and statistical @functions to help you manipulate your 1-2-3 database, plus extensive treatment of macros, from introductory material through advanced commands and macro creation.
496 pp. $26.95*

THE LOTUS GUIDE TO 1-2-3 FOR WINDOWS, by Justin Fielding. This handbook is bursting with inside tips and unique shortcuts for working with 1-2-3/W and Windows itself. Quickly build worksheets with Windows...use 1-2-3/W's powerful graphics, font and publishing technologies... make the most of Windows' Clipboard and data sharing talents...work in 3D, and more. Includes latest undocumented secrets on Lotus's SmartIcon technology. *Essential for all 1-2-3/W users!*
608 pp. $24.95*

ALSO AVAILABLE –

THE LOTUS GUIDE TO 1-2-3, RELEASE 2.3, by Daniel Gasteiger and Nick Delonas. This guide quickly brings you up to speed on Release 2.3's WYSIWYG publishing and Windows capabilities, dialogue boxes, Auditor, Viewer, customizing options and more.
512 pp. $24.95*

THE LOTUS GUIDE TO 1-2-3, RELEASE 3.1+, by Peter Randall. Master Lotus's 3D graphical spreadsheet. Special emphasis on operating environments and using Release 3.1+ with Windows.
720 pp. $29.95*

SPREADSHEET PUBLISHING WITH 1-2-3, by Michael Lunsford and Scott Tucker. This is the essential primer for creating presentation-quality reports with DOS versions of 1-2-3. *Disk includes models for more than 50 financial documents.*
500 pp. $26.95*, with disk $39.95*

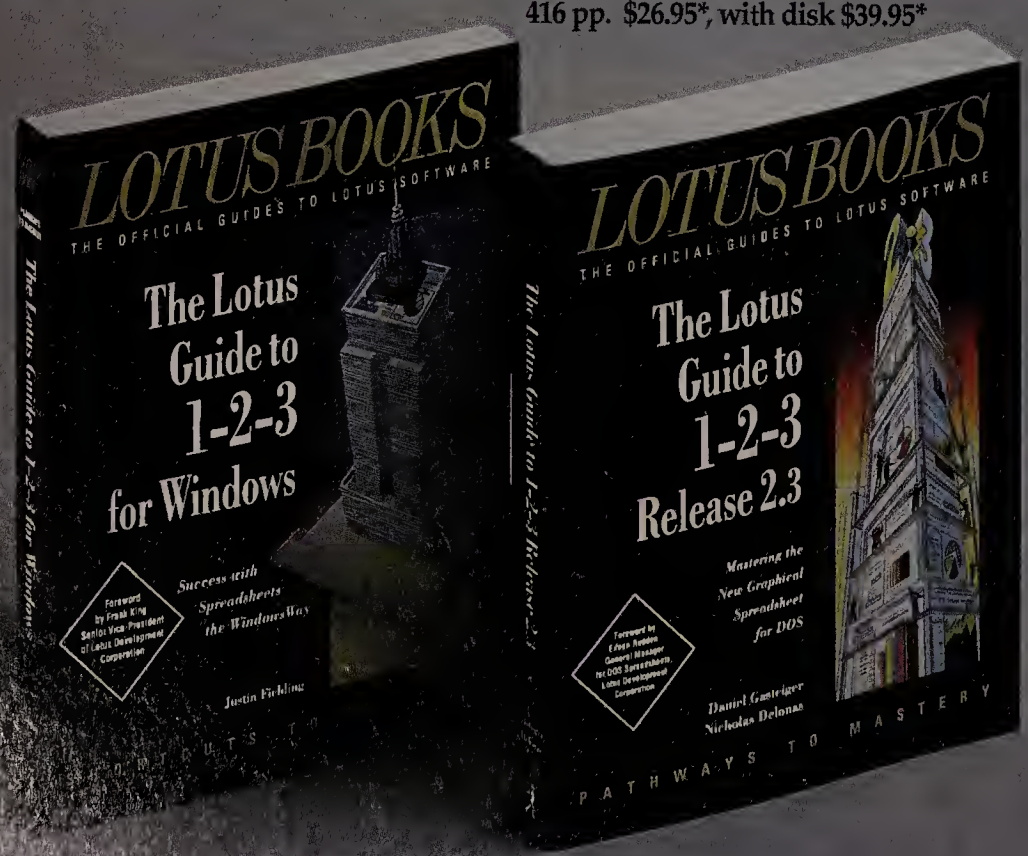
PERSONAL FINANCE WITH 1-2-3, by Steve Adams. Take control of your money with over 30 powerful templates and automated spreadsheet models. *Disk contains all models, templates and macros.*
416 pp. $26.95*, with disk $39.95*

THE LOTUS GUIDE TO LOTUSWORKS, VERSION 3, by Bill Harrison, Jr. Achieve success in your home-office quickly with this clear and concise guide to the latest release of LotusWorks.
450 pp. $24.95*

FOR SPREADSHEET NOVICES –

START HERE WITH LOTUS 1-2-3, by Daniel Gasteiger. The friendly and thorough introduction you need to get up and running in no time. Includes short interactive tutorials that show how 1-2-3 works, plus intro coverage of hardware, DOS and memory issues.
304 pp. $19.95*

START HERE WITH 1-2-3 FOR WINDOWS, by Daniel Gasteiger and Stacy Gasteiger. The only book beginners will need to understand 1-2-3 for Windows! This guide provides the novice with a wide range of quick tutorials, starting with the Windows environment and moving through selected 1-2-3 topics.
350 pp. $19.95*



Available at select bookstores or order direct:

Dial for solutions: 1-800-824-5520

8:30 am–5:00 pm Eastern Time

Outside the U.S., dial 1-410-546-0191

Please have your MasterCard, Visa or American Express card ready.

*Plus $3.00 shipping and handling for first book, $1.00 for each additional book.

LOTUS BOOKS

THE OFFICIAL GUIDES TO LOTUS SOFTWARE

Brady

Published by Brady, a division of Simon & Schuster, in association with Lotus Publishing Corp.

The LOTUS Guarantee

You must be completely satisfied with the books you order or you may return them within 10 days of receipt for a full refund.

Lotus and 1-2-3 are registered trademarks of Lotus Development Corp. Windows is a trademark of Microsoft Corp.

B693

Presenting 1-2-3... With Freelance

If you only need to jazz up a graph in a spreadsheet presentation, by all means stick with *1-2-3*. But when you have to stand before an audience and deliver an important presentation, say to a roomful of potential investors, you'll feel more at ease putting your data in the hands of a dedicated presentation package. *Freelance Graphics for Windows* has scores of chart types and a broad range of colors, fonts, and text styles for dressing up your *1-2-3* data. You're sure to impress your audience when you combine the accuracy of your *1-2-3* data with the creative forces of *Freelance Graphics for Windows*.

You may worry that graphing your *1-2-3* data in *Freelance* means giving up on *1-2-3*'s analytical capabilities. Fortunately, you don't have to choose between the analytical prowess of *1-2-3* and the sophisticated presentation styles of *Freelance*. You can import and optionally link your *1-2-3* data and named graphs to a *Freelance* presentation. Here we'll discuss ways to import your *1-2-3* graphs and data into *Freelance*.

Create quality presentations in a quick Freelance Graphics session.

BY JEFF SUTTON

Figuring Your Import Policy

When should you think about importing data from *1-2-3* to *Freelance*? When you have more data in a worksheet than you care to retype in *Freelance*, and when you have to graph periodically changing data that must always

reflect the latest information. You can import worksheet data into *Freelance* on a one-time basis, or you can establish a file link or a DDE link between a *1-2-3* worksheet and a *Freelance* chart.

Three factors dictate how you should import your *1-2-3* data —your version of *1-2-3*, the type of data you want to import, and whether you want to establish a link between the worksheet and *Freelance*. We'll examine each method and help you decide which to use.

Before we get started, create the sample worksheet shown in **FIGURE 1**. In a blank worksheet, enter the labels and values shown in range A1..D12. Use the *Range•Label•Right* command (in *1-2-3/W, Style•Alignment•Right*) to right-align the labels in range B4..D4. Use the *Range•Format* command to assign the Comma 0 format to range B5..D12 and the Date 2 format to range A5..A12. Finally, select */File•Save* (*File•Save As* in *1-2-3/W*) and enter a name for the file.

	A	B	C	D
1	Worldwide Financial, Inc.			
2				
3				
4		France	Switzerland	Germany
5	07-Sep	2,753	5,321	7,525
6	14-Sep	2,201	5,476	8,753
7	21-Sep	2,000	5,300	9,500
8	28-Sep	1,542	4,752	6,533
9	03-Oct	1,425	3,577	4,501
10	10-Oct	1,100	3,090	3,701
11	17-Oct	1,052	2,590	2,500
12	25-Oct	978	1,987	1,752

FIGURE 1: USE THIS SAMPLE WORKSHEET to graph your 1-2-3 data in Freelance Graphics for Windows.

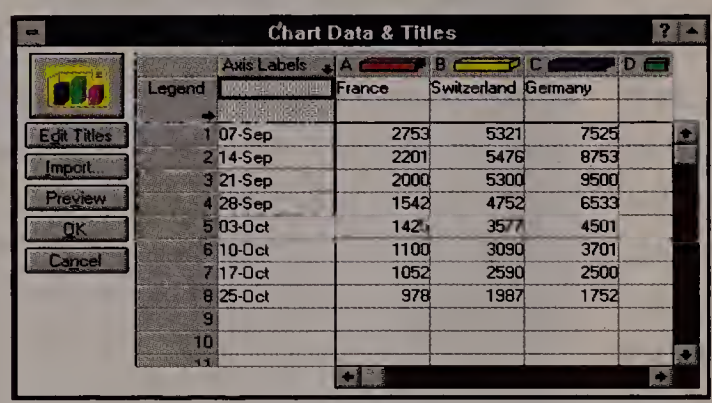


FIGURE 2: DATA IMPORTED FROM 1-2-3 appears in the Chart Data and Titles window, making it easy to see what's being graphed.

Importing 1-2-3/W Data

In *1-2-3/W* you can transfer data quickly between the spreadsheet and *Freelance* via the *Windows* Clipboard. However, since both programs must be open at the same time, you'll need at least 4MB of memory. (If you don't have enough memory, see "Importing 1-2-3/DOS Data.")

To begin, start *Freelance* and create a new presentation: Select *Create a New Presentation*, choose a SmartMaster set, assign the *1 Chart* page layout, and click *OK*. (If you're using *Freelance for Windows* release 1.0, click the *Page Layout* button in the status bar and assign the *1 Graph* layout.) Click the chart placeholder prompt text, choose the *3D Bar (XYZ)* chart type from the New Chart Gallery (the Graph New Gallery in release 1.0), and click *OK*. The Chart Data and Titles window (Graph Data and Titles in release 1.0) is displayed.

Now start or switch to *1-2-3/W* and open the worksheet that contains the source data. Highlight the range of data you want to import (in our example range A4..D12) and choose *Edit•Copy* to copy it to the Clipboard. Then switch back to *Freelance*.

Before you paste the *1-2-3* data, you need to position the cell pointer in the appropriate location in the Chart Data and Titles window. *Freelance* does not accept text within the data area, so if you want to import the graph's axis labels and legends, you must position the cell pointer appropriately. You do this via the two shaded cells in the upper left-hand corner of the window. Position the cell pointer in the bottom cell and select *Edit•Paste*.

As shown in **FIGURE 2**, *Freelance* imports the data into this window, placing the legends along the top of the data area and the *x*-axis labels in the leftmost column. Click *OK* (*Done* in release 1.0) to place the graph in the presentation. Click the graph title placement block, type a title for the chart, and click *OK*.

FIGURE 3 shows the chart that was created by *Freelance* using data imported from a *1-2-3* worksheet.

To establish a link between *1-2-3/W* data and *Freelance*, use the Edit•Paste Special command (Edit•Paste Link in release 1.0). To try it, click the *New Page* button and select *1 Chart* to assign a chart page layout. Click the chart placeholder, select a graph type, put the cell pointer in one of the shaded cells, and select *Edit•Paste Special* (select *Edit•Paste Link* in release 1.0). *Freelance* displays the Edit Paste Special dialog box, as shown in **FIGURE 4**.

This dialog box lets you specify the type of data you're importing and the way it's arranged. The diagram displayed in the right side of the box illustrates the setup of the data in *1-2-3*. Here, the *Whole Chart* (*Whole Graph* in release 1.0) and the *Columns* radio buttons are selected, indicating that the data is arranged in columns. If your data set is reversed, select the *Rows* radio button. Note also that the check boxes *X-axis labels from 1st column* and *Legend labels from 1st row* will reflect the highlighted range of data. If you include the range of legends in the range to import and decide you don't want to import them after all, just clear the check box. When the diagram matches the arrangement of the data set, click *Link Data*, and then click *OK*. *Freelance* imports the data into the Chart Data and Titles window, and this time the worksheet data is underlined in blue, letting you know the data is linked. Click *OK* (*Done* in release 1.0) to import the chart into your presentation.

Importing 1-2-3/DOS Data

If you're using a DOS release of *1-2-3*, you can import your worksheet data by clicking the Import button in the Chart Data and Titles window. When you click the Import button, *Freelance* displays the worksheet data in the Import Data window and waits for you to select the data you want to graph.

To try this, create a new page, assign the

FIGURE 3: A FREELANCE CHART created from 1-2-3 data makes a more powerful presentation than 1-2-3 allows.

1 Chart page layout, click the chart placeholder, select a chart type, and click *OK*. If you're using release 1.0, position the cell pointer in the appropriate shaded cell. Click the *Import* button to display the Import Data File dialog box, and use the Drives and Directories list boxes to specify the directory that contains the source worksheet file. Highlight the file name in the file name text box and click *OK*.

You indicate the range of data to import in the Import Data dialog box, shown in **FIGURE 5**. One of the benefits of this method is that it lets you see the data in the worksheet. You don't have to memorize cell addresses or range names: You simply highlight the data in this window.

If you're using *Freelance for Windows* release 1.0, highlight the range you want to import (in our example, range A4..D12), and click *OK*. The Import Data Destination dialog box appears. If you want to establish a link, select the *Link Data* check box and click *OK*. *Freelance* imports the data and highlights it in blue to indicate that it's linked. Click *Done* when you want to add the chart to the presentation.

In *Freelance* release 2.0, you need to specify at least three data areas individually: the legends, axis labels, and chart data sets. First select the range that contains the legends (here, range B4..D4) and click the *Copy Legends* check box. Notice that the range you selected is outlined in red, matching the red bullet in the Copy Legends area. Next, select the range for your axis labels, range A5..A12, and click the *Copy Labels* check box. Again, you'll see the color coding: this time, green. Finally, select the data points you want to graph, range B5..D12, and click the *Copy Chart Data* check box. This time, a blue outline appears around the selected data.

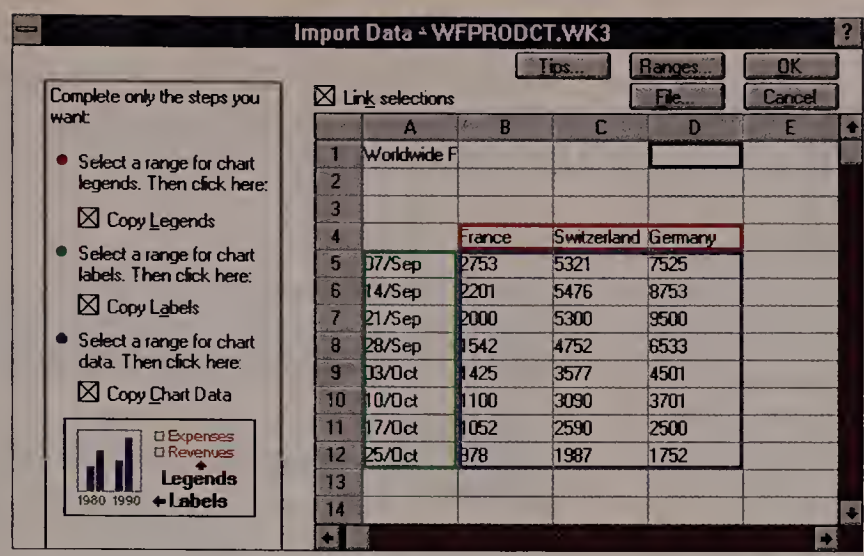


FIGURE 5: THE IMPORT DATA dialog box uses color coding to help you choose the ranges for legend, labels, and chart data. The Link Selections check box establishes a link between the Freelance chart and the data in the 1-2-3 worksheet.

To establish a link between the worksheet data and *Freelance*, click the *Link Selections* check box. Otherwise, just click *OK* to import the selected legends, labels, and data into the data window. If you chose to link to the worksheet, the data will be underlined in blue. If you're satisfied, click *OK* to add the chart to the presentation.

Importing Graphs With File • Import

If you've already created a graph in *1-2-3* and are generally satisfied with its appearance, why bother recreating it in *Freelance?* You can import a *1-2-3* graph and its underlying data directly into *Freelance* with the File•Import Chart command.

To import a graph, select *File•Import Chart* (in release 1.0, select *File•Import Graph*), highlight the source worksheet file, and click the *Named Charts* button to display a list of named charts in the current worksheet. Highlight the name of the chart you want to import and click *OK*. The graph will appear within the chart placement block.

In *Freelance* release 2.0, the File•Import Chart command does not create an automatic link between the named chart and the presentation, nor does it provide a way for you to do this. If you want to link the data, you'll have to do it manually. Select the chart and click the Chart icon (the little bar chart) in the Toolbox. In the Chart Data and Titles window, click the *Import* button, then double-click the name of the source worksheet file. In the Import Data dialog box, highlight the data contained in the graph and select the appropriate check boxes. For example, to establish a link between the legends, highlight the range containing the legends and click the *Legends* check box. Then select *Link Selections* and click *OK*. *Freelance* warns you that the data you are about to place will overwrite the existing data. Just click *OK*. The data from the named graph is now linked to the presentation page.

You'll notice that when you import a named chart from *1-2-3*, *Freelance* either replaces the colors in the chart with its own palette or attempts to duplicate custom colors. In addition, annotations such as text, symbols, and clip art added in *1-2-3* are not copied to *Freelance*. So don't waste time formatting your graphs in *1-2-3*.

Importing Graphs Via the Clipboard

If you're working in *1-2-3/W*, you can copy your graph directly to *Freelance* via the Clipboard, either as an editable graph (linked or unlinked) or as a linked metafile. A graph that is imported as a metafile can't be edited in *Freelance*. On the flip side, chart enhancements such as text and clip art that you added to your *1-2-3* graph are preserved in metafile format. We'll examine linked metafiles in a moment. First, let's copy an editable graph to *Freelance*.

Switch to *1-2-3/W*, use the *Graph•View* command to activate the window containing the graph you want to import, and choose *Edit•Copy*. Return to *Freelance*, create a new page, assign the *1 Chart* page layout, and choose *Edit•Paste*. *Freelance* pastes the graph onto the current presentation page. In *Freelance* release 1.0 the Edit•Paste command automatically establishes a link with the source *1-2-3* data.

In release 2.0, you have to use the

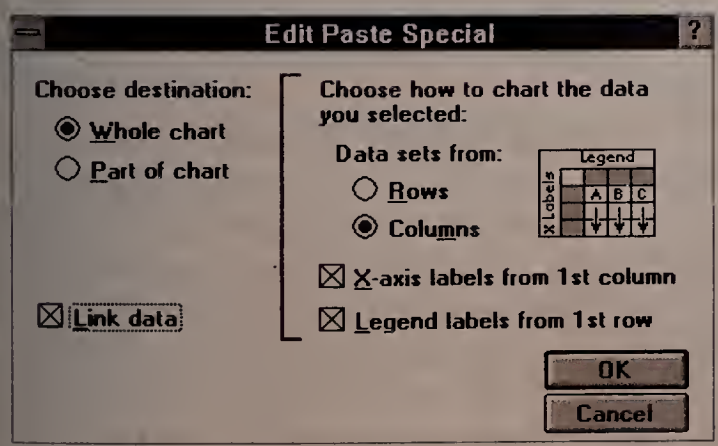


FIGURE 4: THE EDIT PASTE SPECIAL dialog box lets you specify the type of data being imported. Select the Link Data check box to establish a link.

10 Tips for Working Smarter With Freelance

Work faster with SmartIcons. Nothing can streamline and accelerate your work like SmartIcons. A single click often takes the place of several keystrokes and can save you from searching through menus for commands. *Freelance Graphics for Windows* offers more than 70 SmartIcons. In *Freelance* release 2.0, you can also create custom SmartIcon palettes geared to the task at hand.

Just double-click it. As in other *Windows* applications, you can do a lot in *Freelance* by double-clicking, but you have to know where. To change the default attributes of the drawing tools, for example, double-click a Toolbox icon and change settings in the resulting dialog box. To move from the Page Sorter to Current Page view, double-click on the page where you want to work. When you are choosing a SmartMaster set from the Choose SmartMaster Set dialog box, double-click the name of the set you want to use, rather than highlighting the name and clicking OK. Similarly, double-click symbols you want to add from the Add Symbol to Page dialog box (which you access by clicking the Lightbulb icon in the Toolbox). Double-clicking in an empty area in a chart opens the Chart Data and Titles window.

Copy pages from one presentation to another. If you like what you've done in one presentation, don't waste time recreating the same effects in another. To copy pages and their design, open the source and target presentations in Page Sorter view. Select the pages you want to copy in the Page Sorter (click multiple pages by holding down the <Shift> key while you click), then choose *Edit • Copy*. Now move to the target presentation (use the Window menu to display a list of open presentations), and choose *Edit • Paste*.

Switch SmartMaster sets. SmartMaster sets are at the heart of *Freelance*. These templates were designed by professional graphic designers to help you create layouts, color schemes, and font and object attributes automatically. You can switch to a new set at any time without affecting the content of your presentation. To choose a new presentation design, select *Style • Choose SmartMaster Set* and browse through the gallery of more than 60 designs. When you've found the SmartMaster set you want to use, click *OK*. *Freelance* applies the new SmartMaster set, and your data remains intact.

Switch between color and B&W. *Freelance* creates rich color graphics, but few of us have color printers. In release 2.0, every SmartMaster set comes with both a color and a black-and-white palette. Click the *Color/B&W* button on the status bar to switch between the two palettes. If you're using *Freelance for Windows* release 1.0, select *Style • Choose Palette* and choose *BLKWH.PAL* to switch to a black-and-white presentation.

Optimize the Toolbox. If you use the Toolbox a lot, then you're probably familiar with its habit of reverting to the Pointer tool after each use. For example, if you are creating a diagram, you may find yourself drawing a series of rectangles. Normally, you have to click the Rectangle icon in the Toolbox, draw a rectangle, click the Rectangle icon again, draw a second rectangle, and so on. To abbreviate this procedure, choose *Tools • User Setup* and click the *Keep Tool Active* radio button. The tool remains active until you select another.

Add clip art. *Freelance* comes with an extensive built-in library of clip art. The Lightbulb icon in the Toolbox opens the Symbol Library. The Browser takes you on a visual stroll through the symbols. Just double-click on a symbol to copy it from the Browser to the page, where you can size or move it.

Add a speaker note to a page. The Speaker Notes feature, new to release 2.0, lets you record your thoughts as you're working on a presentation. These recorded notes can be used as a script when you deliver your presentation. Choose *Page • Speaker Notes* to open a window that looks like a 3 by 5 index card. You can type your notes here. Later, when you print your speaker notes, *Freelance* prints the presentation page on the top half of the page and your notes on the bottom.

Work in Outliner view. Click the Outliner icon on the right border of the screen to view an outline of your presentation. An icon to the left of each page title shows whether that page contains text, a chart, an organization chart, or a table. While you're in Outline view, you can add text to your presentation quickly and then switch back to Page view to assign page layouts. In release 2.0, you can print the Outline as well: Choose *File • Print*, select the *Outline* button, and click *OK*.

Exploit the automatic build series. Keep the audience focused on the point at hand by creating a build series. A build series reveals a bulleted list one item at a time, building to the complete list. In release 2.0, you can create automatic builds with a single command. With a bulleted list displayed, choose *Page • Create Build* and *Freelance* automatically creates additional pages for each bulleted item you have.

Edit•Paste Special command to link *1-2-3* data to *Freelance*. First copy the *1-2-3* graph to the Clipboard and then switch back to *Freelance*. Create another page and assign the *1 Chart* page layout. Then choose *Edit•Paste Special*. The Paste Special dialog box appears, as in **FIGURE 6**. Select *1-2-3 Graph* from the list of formats and click *Link*. Again, the graph is copied into the placement block. Double-click in an empty area of the graph to open the Chart Data and Titles window. The blue underlining indicates the linked data.

Note that *Freelance* failed to link the legends automatically. To establish the link, click the *Import* button to display the Import Data dialog box. (In some cases, the Import Data File dialog box will be displayed first. If this happens, just reselect the name of the worksheet file that contains the source data.) Highlight the range that contains the legends, select the *Legends* check box, select *Link Selections*, and click *OK*. *Freelance* warns you that existing data will be overwritten. Click *Yes* to replace the unlinked legends with the freshly linked legends. *Freelance* reimports the linked legends into the Chart Data and Titles window. Click *OK* to add the graph to the presentation page.

When you import a *1-2-3/W* graph as a metafile, you're copying an image of the graph, including call-outs, annotations, text formatting, or any other formatting you may have added in *1-2-3*. The downside to this technique is that it does not import the underlying *1-2-3* data.

If you're using *Freelance for Windows* release 1.0, you must add your *1-2-3* graph to the worksheet before you can import it as a metafile. When you've done this, select the graph and choose *Edit•Copy*. Switch to *Freelance* and if necessary, create a new page and assign the *1 Graph* page layout. Then choose *Edit•Paste Link*. Move the graph over the placement box until a dashed line appears. Then release the mouse button to paste the graph into the placement box.

If you decide that you don't want the graph to change when the source worksheet data changes, you can sever the link between the two programs. To do this, select *Edit•Link Options*, select the appropriate link information from the dialog box, and click *Delete*.

If you're using release 2.0, you need to decide if you want to import the chart as a linked metafile. If you do, add the graph to the worksheet, then highlight the range that contains the image, and choose *Edit•Copy*. Otherwise, open the Graph window and select *Edit•Copy*. Then switch to *Freelance*, create a new page, and assign the *1 Chart* page layout. Select *Edit•Paste Special* and a dialog box appears, like the one in Figure 6. Select *Metafile Picture* and click *Paste* to copy the graph without establishing a link, or *Link* to copy the graph and establish a link.

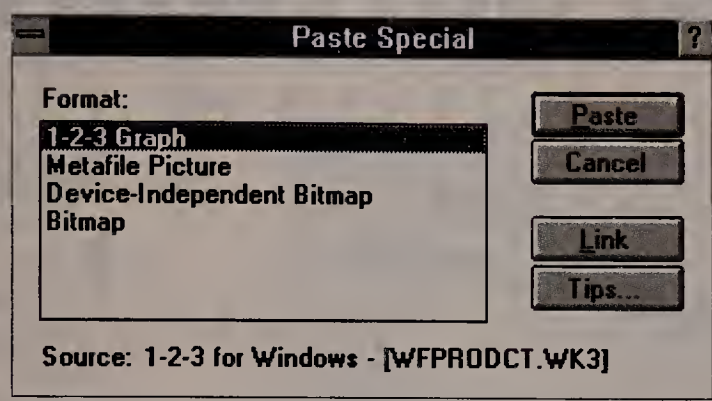


FIGURE 6: IMPORTING GRAPHS from 1-2-3 is easy when you use the Edit • Paste Special dialog box.

When Is the Data Updated?

Naturally you want to make sure your presentation is drawing on the latest data. When is the data in a linked graph updated? The answer depends on the type of link you established—a file link or a Dynamic Data Exchange (DDE) link.

When you establish a file link between a *Freelance* chart and a *1-2-3* worksheet file, the data in *Freelance* is updated every time you open the *Freelance* presentation file.

DDE is the protocol by which data is exchanged between *Windows* applications. When you use the Clipboard to paste-link *1-2-3/W* data into a *Freelance* presentation, you've established a DDE link. If the *Freelance* file and the *1-2-3/W* worksheet are both open, the links are active and the chart data is updated whenever the worksheet data changes. If you close the source *1-2-3/W* worksheet, the link becomes a standard file link and is updated the next time you open the source worksheet or *Freelance*, whichever comes first.

When *Freelance* establishes a link with *1-2-3*, it records the name and location of the source worksheet as the link information. If you move or rename a source worksheet, use the presentation on another machine, or lend your *Freelance* presentation to someone else, make sure the link information reflects the new name and location of the source worksheet. Select *Edit•Links* (*Edit•Link Options* in *Freelance* release 1.0), highlight the link information, and click *Edit* to change it. Note that if you use the presentation on another machine or lend the presentation out, you'll have to copy the source worksheets to the same location so that the link can find its source data.

The next time you have to impress an important client or just spruce up an otherwise boring slide show, bring a copy of *Freelance* along and you're sure to dazzle your audience.

Jeff Sutton is the editor of the Freelance Graphics for Windows Report *and author of* The Lotus Guide to Freelance Graphics for Windows.

Making the Freelance Connection

Three factors dictate how you should import *1-2-3* data into *Freelance*: the release of *1-2-3* you're using, the type of data you want to import, and whether or not you want to establish a link between *Freelance* and *1-2-3*. Here are the commands:

TASK:	IN FREELANCE 1.0	IN FREELANCE 2.0
Import 1-2-3/W data and graphs	Edit • Paste	Edit • Paste
Link 1-2-3/W data and graphs	Edit • Paste Link	Edit • Paste Special
Import 1-2-3/DOS data	Import button	Import button
Import 1-2-3/DOS graphs	File • Import Graph	File • Import Chart

```
   A        B      C      D      E      F      G
1  Target Allocations
2
3  \t          {GETNUMBER "Enter target value: ",targval}
4              {IF @ISERR(targval)}{BEEP}{\t}
5              /RNCmatch~~/RNDmatch~
6              /RNCtarget~~/RNDtarget~
7              /RNCmatch~{ESC}{?}~
8              /RNCtarget~{ESC}{?}~
9              {LET tempval,@SUM(match)/targval}
10             {FOR coff,0,@MIN(@COLS(match),@COLS(target))-1,1,cloopt}
11             {CALC}
12
13 cloopt      {FOR roff,0,@MIN(@ROWS(match),@ROWS(target))-1,1,rloopt}
14
15 rloopt      {PUT target,coff,roff,@INDEX(match,coff,roff)/tempval}
```

FIGURE 1: THE TARGET ALLOCATION MACRO lets you set a goal while still keeping your existing data patterns intact.

```
   A            B      C      D      E      F      G
18 Percentage Growth/Decline
19
20 \p          {GETNUMBER "Enter percentage (for e.g., 5%): ",targval}
21             {IF @ISERR(targval)}{BEEP}{\p}
22             /RNCmatch~~/RNDmatch~
23             /RNCtarget~~/RNDtarget~
24             /RNCmatch~{ESC}{?}~
25             /RNCtarget~{ESC}{?}~
26             {FOR coff,0,@MIN(@COLS(match),@COLS(target))-1,1,cloopp}
27             {CALC}
28
29 cloopp      {FOR roff,0,@MIN(@ROWS(match),@ROWS(target))-1,1,rloopp}
30
31 rloopp      {PUT target,coff,roff,@INDEX(match,coff,roff)*(1+targval)}
```

FIGURE 2: THE PERCENTAGE GROWTH AND DECLINE MACRO shown here adjusts your data by a constant percentage.

```
   A      B      C      D      E      F      G
34  Fixed Average
35
36 \a        /RNCmatch~~/RNDmatch~
37           /RNCtarget~~/RNDtarget~
38           /RNCmatch~{ESC}{?}~
39           /RNCtarget~{ESC}{?}~
40           {LET tempval,@AVG(match)}
41           {FOR coff,0,@MIN(@COLS(match),@COLS(target))-1,1,cloopa}
42           {CALC}
43
44 cloopa    {FOR roff,0,@MIN(@ROWS(match),@ROWS(target))-1,1,rloopa}
45
46 rloopa    {PUT target,coff,roff,tempval}
47
48 targval
49 tempval
50 coff
51 roff
```

FIGURE 3: FIND THE AVERAGE of a range of values to rule out seasonal trends.

ed in the current directory. Highlight the range that contains the macros (A1..B51), and select *No. 1-2-3* removes the macros from the worksheet, stores them in the macro library, and loads the library file into memory. To run the macros in the future, attach and invoke the Macro Library Manager, select *Load*, indicate the name of the macro library file, and select *Quit*.

If you're using a 3-D spreadsheet (*1-2-3* release 3.*x* or *1-2-3 for Windows*) and you store your macros in a separate worksheet, precede all boldface range names in the macros with the path and file names of the macro worksheet. For example, if your macros are in the BUDMACRO file in the default directory, enter **<<budmacro>>** before each range name in the macros. Whenever you need one of the macros, select *File•Open* to open the macro worksheet.

Creating the Sample Worksheet

To test the macros, create the sample office expenses budget shown in **FIGURE 4**. Start in a blank worksheet, select */Worksheet•Global•Format•Currency*, and enter **2** to assign the Currency format with two decimal places. Use the *Worksheet•Column•Set-Width* command to set the width of column A to 15 and the width of columns B through F to 11. Then enter the labels in ranges A1..A8 and B3..F3 and the values in range B4..E7.

Enter the formula **@SUM(B4..B7)** in cell B8 and copy it to range C8..E8. Enter the formula **@SUM(B4..E4)** in cell F4 and copy it to range F5..F8. Select */Range•Label•Center* and indicate range B3..F3. Copy range A1..F8 to cell A12, and change the labels in cell A12 and range B14..F14 to reflect those shown in Figure 4. Select */Range•Erase* and indicate range B15..E18. Finally, select */File•Save* and enter a file name.

The macros use two ranges in their operations: the Match range and the Target range. The Match range contains your actual data, while the Target range is simply the one where the projected values will appear. You can specify the same range for the Target and Match ranges. If you do, the macro will overwrite your actual data with the projected data.

If you're using *1-2-3* release 3.*x*, you can also specify separate sheets in a 3-D file as ranges. For example, if your 1993 budget is on sheet A and your 1994 budget is on

sheet B, you can indicate a range on sheet A as the Match range and one on sheet B as the Target range. You cannot, however, specify 3-D ranges.

Allocating Right on Target

Allocating a resource among entities is a common task in any industry. Whether you're budgeting operating expenses, distributing products among warehouses, or estimating materials to be purchased, you need to allocate items by using a target value and existing data patterns.

In the office expenses budget, the actual amount for 1993 telephone expenses was $1065, shown in cell F5. This total is made up of quarterly expenditures of $250, $220, $275, and $320, shown in range B5..E5. If you have a budget of only $1000 for telephone expenses for 1994, you need to reduce each quarter's expenditures. But by how much?

To find out, first divide each of last year's expenses by last year's total to get the quarter-to-total ratio. Then multiply this ratio by the new target value in order to get the projected amount.

Why do you need a macro for something this simple? Try doing it over and over on several large worksheets, and you'll see.

The macro in Figure 1 needs only a target value, a Match range, and a Target range to allocate these costs for you. Try it: Press **<Alt>-T** (**<Ctrl>-T** in *1-2-3/W*), enter **1000** as the target value, indicate range B5..E5 as the Match range, and range B16..E16 as the Target range. *1-2-3* reduces the quarterly telephone expenses to $234.74, $206.57, $258.22, and $300.47 respectively. Notice the new total in cell F16: $1000.

If you're calculating brand-new projections, and historical data is unavailable, enter the relative values of each cell to the target. For example, to spread a value evenly among the Target range, enter **1** in each cell of the Match range, then indicate that range as the Target range.

You can also use this macro along different dimensions (vertical or horizontal ranges). For example, you can target the expenses for one quarter just as easily as you targeted expenses for one item. If you prepare quarterly budgets, you can indicate range B4..B7 as the Match range and range B15..B18 as the Target range, and *1-2-3* will allocate the proper amount among each of the expenses for the first quarter. The same holds true for the other macros.

Projecting the Future

You expect next year's sales to increase by 15 percent and payroll to jump 10 percent. You must reduce travel and entertainment expenses by 5 percent and hold the line on telephone expenses. The macro in Figure 2 can calculate these projections. It prompts you for the growth or decline rate, adjusts the values in Match by that rate, then places the adjusted values in Target.

Whether you're projecting sales or budgeting expenses, these macros help you set the right goals.

Suppose you want to increase the supplies budget by 10 percent. Press **<Alt>-P** (**<Ctrl>-P** if you're working in *1-2-3/W*), enter **10%** at the prompt, and specify range B4..E4 as the Match range and range B15..E15 as the Target range. The macro returns the adjusted values: $319, $330, $330, and $341. To reduce the copier expenses by 5 percent, press **<Alt>-P**, enter **-5%** at the prompt, and specify ranges B6..E6 and B17..E17 as the Match range and Target range. The macro returns the reduced values for the copier expenses.

Sometimes you simply want to make some quick calculations without worrying about seasonal trends. For example, you may want to find the average number of sprockets sold last year, to use in the projection for the coming year. The Fixed Average macro finds the average of the values in Match and enters it in every cell of Target. As with the previous macros, you can use the same range for Match and Target. If you do, remember the macro will overwrite existing data.

You've come to the last item in your office expenses budget: postage. A good way to determine what 1994's postage expenses will be is to take the average of 1993's postage expenses. Press **<Alt>-A** (**<Ctrl>-A** if you're using *1-2-3/W*), then specify ranges B7..E7 and B18..E18 as the Match and Target ranges. The macro finds the average spent on postage in 1993 ($78.75) and enters this value in each cell in the Target range.

While you could do such calculations manually, these macros free you from worrying about line item arithmetic, so you can think about where your business is going.

Helen Chen conducts market analysis at Pizzano & Company, an economic consulting firm in Woburn, Massachusetts.

Models on Disk includes the models, macros, or formulas contained in this article. See page L10 for details. This material is also available on CompuServe and from PC World Online.

	A	B	C	D	E	F
1	**Actual Operating Expenses - 1993**					
2						
3		Q1.93	Q2.93	Q3.93	Q4.93	**Total 93**
4	Supplies	$290.00	$300.00	$300.00	$310.00	$1,200.00
5	Telephone	$250.00	$220.00	$275.00	$320.00	$1,065.00
6	Copier	$60.00	$50.00	$50.00	$80.00	$240.00
7	Postage	$75.00	$65.00	$75.00	$100.00	$315.00
8	**Total Expenses**	$675.00	$635.00	$700.00	$810.00	**$2,820.00**
9						
10						
11						
12	**Projected Operating Expenses - 1994**					
13						
14		Q1.94	Q2.94	Q3.94	Q4.94	**Total 94**
15	Supplies	$319.00	$330.00	$330.00	$341.00	$1,320.00
16	Telephone	$234.74	$206.57	$258.22	$300.47	$1,000.00
17	Copier	$57.00	$47.50	$47.50	$76.00	$228.00
18	Postage	$78.75	$78.75	$78.75	$78.75	$315.00
19	**Total Expenses**	$689.49	$662.82	$714.47	$796.22	**$2,863.00**
20						

FIGURE 4: THE SAMPLE OFFICE EXPENSES BUDGET is a good place to test the budget macros.

3
9
5
7
e
R
4
2
x
L

Part database and part electronic mail, *Notes* has always defied easy categorization. Even Lotus Development describes it a little differently each month. But as Lotus rolls out *Notes 3.0*, a new milestone release, its purpose and power have become quite clear.

Notes is a network application environment that allows groups of users to share information. The users can be anywhere—in the same office, across town, or across the country. The information they share is not bound by

Notes 3.0

Brings More Power to the Group

Lotus's information-sharing environment adds full-text searches, Macintosh support, and more capable development tools.

constraints inherent in other software. If you can create it on a personal computer, *Notes* can store it, index it, display it, manage it, route it, and share it. *Notes* can also use other programs to display what it can't; an object embedded in a *Notes* document can launch the program that created it. This flexibility means you can use *Notes* to store and retrieve virtually any conglomeration of collected data, and you are able to computerize tasks that would stymie other programs. For instance, a user at an aerospace firm can create a *Notes* document database of the

By Bill Lawrence

TERRY WIDENER

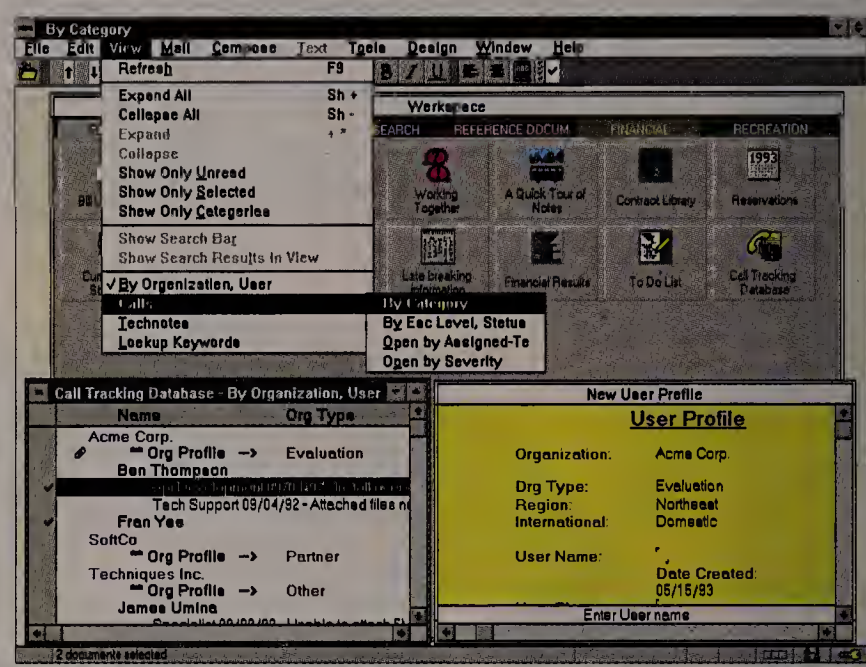
company's written procedures for maintaining jet engines. The entire body of procedures can be indexed to permit keyword and phrase searching. Procedures that are particularly complex can also be documented in video; an icon that launches a video clip can be embedded right in a procedure document. A file for an engineering drawing built with a CAD package can be stored in a *Notes* document as well; clicking the file's icon launches the CAD program.

Though *Notes* comes with 50 prebuilt applications, its strength lies in custom applications. Initially, such applications will be written by computer professionals, but users who grapple with *1-2-3* macros will be able to build or modify many *Notes* databases.

Under the covers, *Notes* is a client-server environment—that is, part runs on user workstations ("clients") and part on a dedicated server. Users exploit the graphical interface of *Windows* or OS/2 to access or create applications or send E-mail. The server software, which runs on top of OS/2 or (now) *Windows*, stores and indexes databases, manages E-mail, enforces security, and synchronizes information at multiple sites. (In *Notes* terminology, it replicates databases between servers.)

What's New in Version 3.0?

Notes 3.0, which now lists for $495 per user or server, brings a wealth of new enhancements. The *Windows* version sports a palette of SmartIcons like those in *1-2-3/W*, *Ami Pro*, and other Lotus *Windows* programs. An industrial-strength text search and retrieval engine can index entire groups of documents so you can find occurrences of words or phrases very quickly. Macintosh users can now use *Notes* to compute collaboratively with their PC-equipped col-



CLEANER MENUS PLUS SMARTICONS and other on-screen aids offer shortcuts to Notes tasks.

Users Say Notes 3.0 Should Pay Off Big, but It Requires Investment and Teamwork

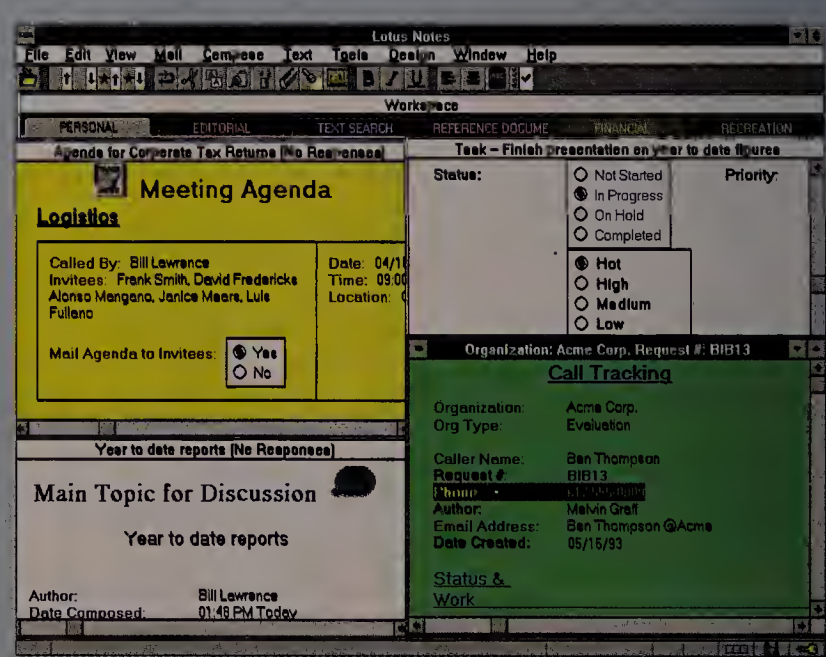
With *Notes 3.0*, what users see is definitely not all they get.

The newest version of *Notes* sports a relatively minor face-lift. SmartIcons give the interface a more contemporary look and feel, and menu commands have been moved around and organized more logically.

But the real change is in what users can *do* with *Notes 3.0*. With developers ready to take advantage of the new version's macros, @functions, security provisions, and full-text search and work-flow capabilities, *Notes 3.0* users should soon find themselves putting the software to uses far beyond the simple databases and routine E-mail for which it has mostly served so far.

Staffers in the mergers and acquisitions department of a New York brokerage firm, for example, will soon be relying on *Notes 3.0* to coordinate deals and manage prospect lists. In one 3.0 application, they'll access a catalog of deal-related documents, scanned in and attached with the *Lotus Notes Document Imaging* add-on package. A second application will allow them to access lists of prospects and work groups, all pulled in automatically from a cardfile application.

By incorporating release 3.0's new button macros, SmartIcons, and @DBLookup function, the firm's applications allow the rapid-fire point-and-click maneuvers that earlier *Notes* versions lacked. With the click of a button, users can flip from a view in one database to a view in another—a task that in previous releases required users to manually load different databases, explains Robb Kushner, senior consultant for MFJ Int'l, the Manhattan-based reseller that developed the application. "Version 3.0's somewhat relational capability is the key," says Kushner, referring to the program's capability to link multiple databases.



BUILT-IN TEMPLATES LET YOU CREATE useful applications right from the start. Notes provides 50 such applications, including discussion databases, client-contact and call-tracking systems, task-management logs, and meeting notification systems.

leagues, and there's now a *Windows* server version for *Notes* administrators who don't want to wrestle with OS/2. Dial-in users get some help, too. To top it off, *Notes 3.0* comes out of the box ready to work with sound and video data, provided you have the hardware to do the job.

Notes 3.0 application designers and administrators find an even longer list of enhancements than do end users. New form design options such as action buttons as well as a host of new @functions and macro features give application developers more tools—many of them helpful in building work-flow applications. Administrators can now manage *Notes* servers over the network from remote workstations and can enter user updates in batch mode rather than manually entering each name.

A Better Window to Your Information

Notes 2.0's file folder motif has been very popular, but the interface is looking a bit tired. *Notes 3.0* adds touches needed to modernize its look and feel. A palette of SmartIcons similar to those in other Lotus *Windows* applications is now available, and other on-screen button shortcuts make it easier to change settings such as fonts or handle tasks such as checking your mail. The SmartIcon selection is extensive; an icon is provided for most of the menu selections available in *Notes 3.0*.

USERS OF NOTES FOR THE MACINTOSH can share a variety of application templates with their PC-equipped colleagues.

Document listings are also more graphical. Users can customize fonts and mark to-be-deleted documents with a trash can icon. Application developers can use a similar feature to display database view options as icons instead of as text descriptions. For example, a view that lists a database's documents grouped by their creators can

Notes' new database capabilities, while falling far short of full-blown relational offerings, make version 3.0 a welcome improvement for developers, says Debbie Molino, associate director for *Notes* development and training for Price-Waterhouse's Information and Technology Center in Tampa. With 10,000 U.S. users, Price-Waterhouse is one of the largest *Notes* installations, and Molino is a big *Notes* booster.

> You have to emphasize the importance of everyone's participation, because if everyone doesn't participate, Notes goes down the tubes. –Sally Blanning DeJean

Among the first *3.0* features that developers are eyeing is full-text search. "We have voluminous databases that people want to search, and when we converted mainframe applications and relational databases to *Notes*, users had to give that up," Molino explains. Version 3.0 rectifies the problem, offering desktop-PC users access to the wealth of data that was formerly the province of the mainframe.

Molino reports that Price-Waterhouse developers also expect to make extensive use of version 3.0's expanded work-flow features, which set up a standard path for a task and route it automatically to everyone who needs it. Version 2.0 offered little in the way of true work-flow assistance, unless the application designer did some serious programming, says Molino. But version 3.0 changes all that. The new Autosend feature, for example, serves as an electronic tap on the shoulder, automatically delivering mail messages that notify users of their turn to perform a step.

Ironically, *Notes 3.0*'s expanded automation features may mean more, not less, end-user training. "As more involved applications are developed under version 3.0, end users and managers will need more education to understand what the program can do," says Kushner.

As with other groupware products, some of the most important user training will be in the notion of team software. "It's a new concept," says Sally Blanning DeJean, a *Notes* consultant in Newton, Massachusetts, who served as a beta tester.

SETH RESNICK

DeJean insists that her clients schedule two days of classes for new *Notes* users. In addition to learning keystrokes, she says, *Notes* trainees are often learning the business of teamwork. "You have to emphasize the importance of everyone's participation, because if everyone doesn't participate, *Notes* goes down the tubes."

—Deborah Asbrand

now be shown instead as a person icon on the View menu. In fact, *Notes 3.0* is one of the few cases in which a PC-*Windows* interface is more graphical and intuitive than a Macintosh equivalent.

Text Indexing

From an end user's viewpoint, *Notes 3.0*'s most striking new feature is very powerful full-text searches.

Notes 2.1 searches text like most other *Windows* applications; you can select a group of documents and search for a word or phrase. The search runs until you encounter the first occurrence of your word or phrase. You must select Find Again to restart the search.

Notes 3.0 lets you build an index in advance, which ensures that even very large document group searches happen almost instantly. It doesn't stop with the first find, but instead lists all documents containing text satisfying the search condition. From this list, you can quickly scan each document to see the individual occurrences of the text you requested. You can also build complex queries with multiple AND and OR conditions. If you're doing network product market research for a disk drive manufacturer and want to scan a list of press releases dated from January 1992 forward, you can scan for documents that contain the words *disk*, *storage*, or *drive*, and the words *network*, *LAN*, or *server*.

Nomenclature for Notes Writers

Once you start to develop or modify *Notes* applications, it quickly becomes apparent that this unique tool doesn't work like other application development packages. Nonetheless, the underlying design concepts are straightforward.

A *Notes* application works on one or more databases, and each database is a collection of related documents.

Users create a document by entering information into a form. Developers create each form to define the way users enter information and how they view it. A form is comparable to a database record: it's composed of fields of data.

Information is presented through a view, which is a summary of the documents in a database. Like a database report, a *Notes* view displays specified fields from the individual documents, sorted appropriately. Each row in the view represents one document. A *Notes* database can show many different views.

Notes macros are procedures that act on multiple documents at once; their overall role is much like that of their *1-2-3* kin.

FORMS COMBINE THE BUILDING BLOCKS of Notes applications. Fields, which receive data, are arranged on the form, and action buttons launch macros. The documents in an application database can be sorted into various views based on key fields.

Playing to a Bigger Audience

Notes 2.1 shared information well, but to a homogeneous audience. PCs running *Windows* or OS/2 connected to networks running IBM's NETBIOS communications protocol were the only members. *Notes 3.0* embraces a more diverse constituency, broadening the program's definition of a work group. In particular, Macintoshes can now run *Notes* and share data transparently with PCs.

Macs are not quite first-class citizens in the *Notes 3.0* realm, however. Because Macs don't support *Windows*-specific tools such as OLE and DDE, you can't launch an application from an embedded file object. Mac users can only partially exploit *Notes 3.0*'s new text searches. They can perform word and phrase searches of databases that have been indexed by PC users or indexed on a *Notes* server, but they can't create their own text search indexes.

> The new Windows server dramatically lowers Notes' entry barriers.

Notes 3.0 has also been engineered to run on virtually any network. In addition to NETBIOS, *Notes* can run on networks running Novell's widely used IPX/SPX protocol, Apple's AppleTalk protocol, or the TCP/IP protocol commonly used on networks of UNIX devices.

Notes previously required an OS/2 server, but Lotus has created a *Windows* server that adds the sophisticated multitasking, security, and other server requirements that OS/2 provides but vanilla *Windows* lacks. Lotus claims this server will handle up to ten concurrent users as robustly as the OS/2 version. You can buy a $995 starter pack with the *Windows* server and two clients, which dramatically lowers *Notes'* entry barriers for small organizations. Lotus will also offer servers for NetWare and UNIX by year-end, and CompuServe plans a range of dial-up *Notes*-based services.

Help on the Road

One of *Notes'* strengths is the way that it connects users who may be working on different networks—or not on networks at all. *Notes 3.0* provides two important benefits

for dial-up remote users. First is selective replication: Instead of wasting valuable transmission time while an entire database is downloaded from the server, a remote user can download just the portion of interest—for example, only those documents that apply to a particular sales region or only the documents created since yesterday. Second, dial-up users can do their updates as a background process—the *Notes* desktop remains available while the modem works away.

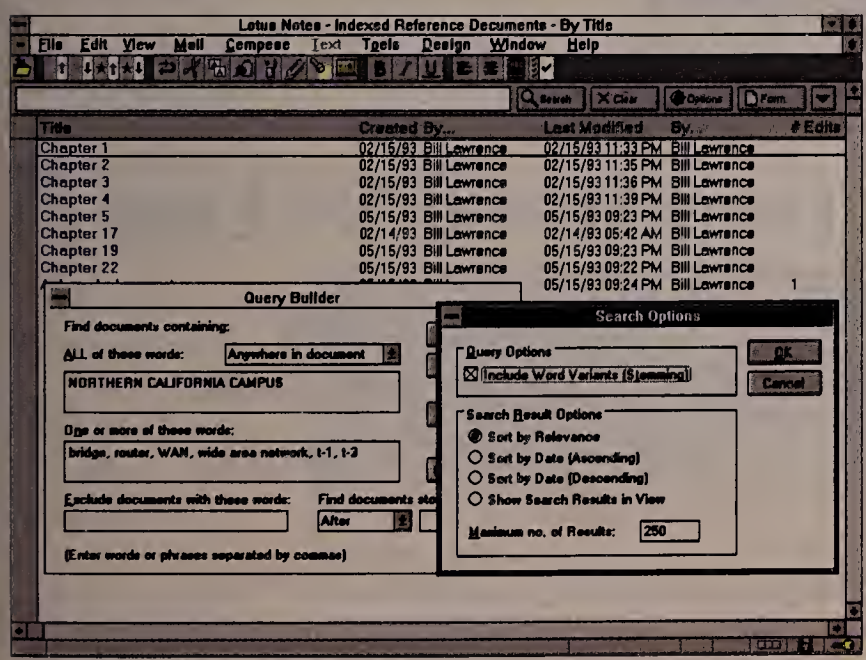
Data That Is Seen and Heard

Notes 3.0 is preparing for the day when computer users will be able to hear and watch data as well as read it. How soon that day will arrive for you depends on how much you're willing to invest in the necessary hardware. *Notes 3.0* includes the Lotus Sound and Lotus Media Manager modules, which use OLE to embed sound, MIDI (Musical Instrument Digital Interface), and movie objects in *Notes* documents. You'll need a sound card and speakers to listen to sound objects, while movies can be viewed on a VGA or better display. (Full-motion, full-screen PC video, however, demands specialized equipment.)

The crunch comes when you try to provide enough disk space to store sound and video files. Until high-density storage devices such as CD ROM drives and optical disks become more common, sound and video will be relegated to novelty status.

Going With the Work Flow

Notes 3.0's programming enhancements aim to make it a uniquely capable general-purpose tool for creating work-flow applications, which take the burden of routine tasks off the user. For instance, consider an electronic expense form that must be routed from the person who first fills out the form, to a line manager who approves

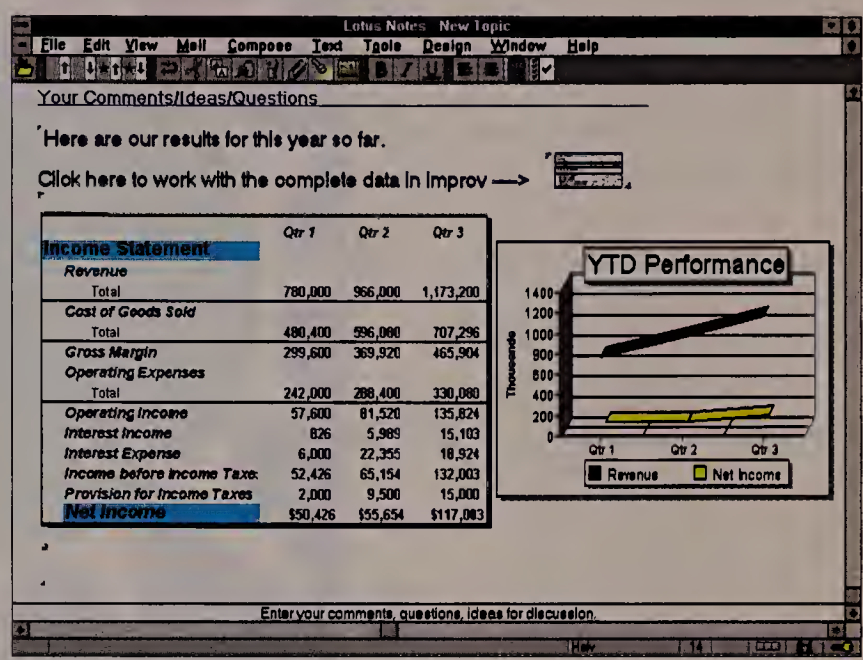


POWERFUL TEXT INDEXING AND RETRIEVAL CAPABILITIES let you build complex text search queries that rapidly scan multiple documents for the information you specify.

it, to a business manager, and finally to an accounting employee who issues a reimbursement check.

Among many new work-flow application building blocks, the most interesting are action buttons—point-and-click buttons that can be placed in *Notes* forms to launch whatever formula or macro-driven action the developer specifies. Typical examples in an expense report routing application might include buttons labeled Send to Manager, Approve, or Return to Sender.

A *Notes 3.0* tool called the background macro can ensure that work-flow documents are indeed flowing. For instance, a background macro can run daily to automatically check for expense re-



IMPROVED SUPPORT FOR OLE has Notes 3.0 behaving more like a Windows application. Clicking on the Improv icon at the top of the message launches you into that spreadsheet.

ports that have been awaiting approval for more than three days and generate reminder notices to those who have not routed their pending expense forms at appropriate times.

Notes 3.0 security has been made more flexible to further facilitate documents' circulation among groups of users. Now the application designer can enforce security at the individual document level (rather than at the database level) or divide a document into security sections, giving each user only the access he or she needs.

Echoing a feature found in high-end database engine environments, *Notes 3.0* lets an organization establish a central database dictionary. This ensures consistency among databases—speeding development, avoiding errors, and making it easier for users to work with multiple databases.

With a central database dictionary, data fields and other design components can be used by many applications but managed from a central point. For example, a field that contains a pick list of your company's regional sales offices can be changed in the database dictionary when a new office is opened, and the change will be reflected in all applications that use the field.

Overall, *Notes 3.0* offers enhancements in virtually every aspect of the program: application design, back-end services, cross-platform support, and usability. These improvements should please users, application developers, and administrators alike. If your organization needs the best digital toolbox around to manage, display, and share information, look no further than *Notes 3.0*, a unique tool for empowering work groups.

Bill Lawrence is a network engineer for a major western utility and a contributing editor for PC World Lotus Edition. *Deborah Asbrand is a freelance writer in Boston.*

See Us At

A Conference and Exposition for Users and Developers

LotusWorld '93 *West*

In the Fall
Dates to be announced
California

LotusWorld '94 *East*

April 18 - 21, 1994
Hynes Convention Center
Boston, Massachusetts

In response to your needs, Lotus Publishing Corporation, the sponsor of LotusWorld will be hosting a LotusWorld '93 *West* in California and a LotusWorld '94 *East* in Boston, in an effort to bring information closer to your own location.

LotusWorld® offers an unparalleled opportunity to learn all about the latest strategies, technologies and products, to exchange ideas and information, and to get proven solutions to increase your business productivity. *Act Now to receive more information on these upcoming events by calling* **1-800-524-1857**

The Official Lotus Conference and Exposition for Users and Developers

© 1993. Lotus Publishing Corporation. LotusWorld is sponsored by Lotus Publishing Corporation, an IDG Communications Company.
LotusWorld and Lotus are registered trademarks of Lotus Development Corporation. All company and product names are trademarks of their respective corporations.

Keep Track of Time in Your Worksheets

Much of business today is time sensitive. Your mail room might log the arrival of packages throughout the day. Your factory might record the departure of product shipments. Keeping track of employee hours, recording sensitive financial transactions, and monitoring the duration of processes in manufacturing and research and development can involve reading the clock. If you track time in a spreadsheet, it helps to understand how your software works with the clock.

The Concept of Time

You probably already know how *1-2-3* works with dates: The spreadsheet assigns a serial number to each date since the beginning of this century. January 1, 1900, is day 1; June 1, 1993, is day 34121; and December 31, 2099, is day 73050.

Similarly, *1-2-3* thinks of the current time as the percentage of a day that has passed since midnight. At 6 a.m., 25 percent of the day has passed, so *1-2-3* assigns the decimal 0.25 to 6 a.m. At noon, 50 percent of the day is gone, so *1-2-3* assigns it the decimal 0.5. At noon on June 1, 1993, 50 percent of the 34,121st day has passed, so *1-2-3* assigns that date and time the number 34121.5.

Few of us would do time calculations if we had to think of time in these terms. Fortunately, *1-2-3* has many tools to help you work with time serial numbers. If you've worked with dates, you're probably familiar with one of those tools, the @NOW function.

The Time Is Now...

The @NOW function returns a combined date and time serial number that represents the moment your software calculated the function's result in the worksheet. *1-2-3* updates the result whenever you force a recalculation—for example, when you make another entry in the worksheet, or when you reopen the worksheet. Many people use @NOW to find out when their worksheet was last printed. @NOW is also useful when you're creating several versions of a worksheet and you need to know exactly when each was created. @NOW saves you the trouble of updating the date and time yourself.

The @NOW function is useful when you need to know exactly when each version of a worksheet was created.

Test @NOW in a blank worksheet. Move the cell pointer to cell B1 and type **@NOW**. Since the @NOW function takes no arguments, just press **<Enter>**. *1-2-3* should return a serial number with five digits before the decimal point and at least one after. If you want to see more values after the decimal point, use the Worksheet•Column•Set-Width command to increase the column width.

To see what time of day the serial number represents, you'll have to assign cell B1 one of four Time formats: 1 (HH:MM:SS AM/PM), 2 (HH:MM AM/PM), 3 (Long Intn'l), or 4 (Short Intn'l).

The first two Time formats are self-explanatory. The third and fourth depend on your worksheet's default International Time format. To check on this, select */Worksheet•Global•Default•Other•International•Time* (in *1-2-3/W*, select *Tools•User Setup*, click the *International* button, then click the *Time* drop-down box), and *1-2-3* presents you with four International formats: A (HH:MM:SS), B (HH.MM.SS), C (HH,MM,SS), and D (HHhMMmSSs). These formats have different hour/minute/second separators and can appear with or without seconds. Long International formats display the seconds; Short International formats do not.

If you specify the global Time format to be D (4 in *1-2-3/W*), 4:30 p.m. appears as 16h30m00s. To see what the global Time default has been set to, select */Worksheet•Global•Default•Status* (in *1-2-3/W* select *Tools•User Setup*, click on the *International* box, and look at the *Time* box). The standard default is A (1 in *1-2-3/W*) and it appears as HH:MM:SS in the status box (in *1-2-3/W* it appears in the status box as 11:59:59). In our example 4:30 p.m. would appear as 16:30:00 (Long International) or 16:30 (Short International).

With the cell pointer in cell B1, select */Range•Format•Date•Time*, select *1*, and press **<Enter>** to assign cell B1 the Time 1 format (see **FIGURE 1**). In *1-2-3/W*, select *Range•Format*, select *6: 11:59:59 AM*, then click *OK* (see **FIGURE 2** on the next page). Asterisks fill the cell because the formatted entry is too wide for the column. Select */Worksheet•Column•Set-Width*, press **<Right>** repeatedly until a time appears in cell B1, and then press **<Enter>** (in *1-2-3/W*, select *Worksheet•Column-Width* and enter **10**).

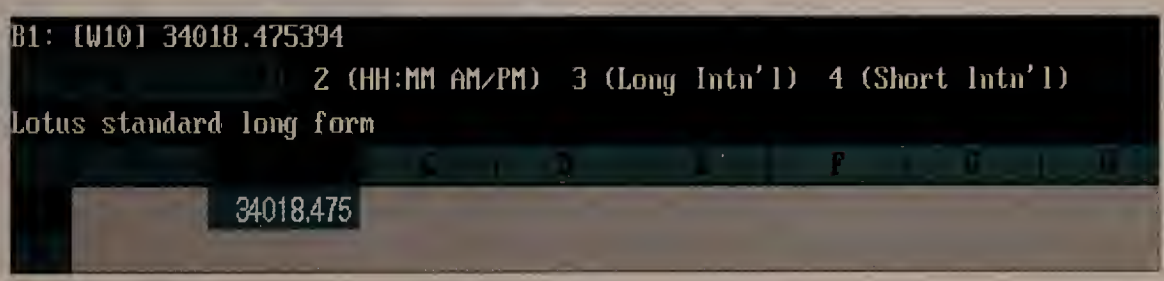


FIGURE 1: ASSIGN ONE OF FOUR TIME FORMATS to cell B1 to see what time of day the serial number represents. Formats 3 and 4 depend on the International Time format default.

The entry in cell B1 appears static while you're simply browsing the worksheet, but as soon as you make another entry, *1-2-3* updates the @NOW function. Move the cell pointer to cell A1, type the label **now**, and press **<Enter>**. The @NOW function in cell B1 reflects a more current reading of the clock. This is useful when you want to

know when your worksheet was last printed, but what if you want to know the date and time the worksheet was created? You don't want *1-2-3* to update this information every time you use the worksheet.

You can make the result of an @NOW function stable by converting it to its current value before storing it in the worksheet. To try this, move the cell pointer to cell B2, type **@NOW**, and press **<F9>**. The serial number for the current date and time appears in the control panel. To enter this value into the worksheet, press **<Enter>**. Select */Range•Format•Date•Time* and indicate *1* to assign the Time 1 format to cell B2 (in *1-2-3/W* select *Range•Format*, select *6: 11:59:59 AM*, and click *OK*).

When the result of @NOW is converted to a static value, you can use it to calculate the time that has elapsed since you first entered the function in the worksheet.

Say you work for a testing center and you've created a macro to monitor the time it takes a student to complete a test. The macro could use @NOW to record the student's starting time in one cell (say, cell A1). The macro would convert that time to a static value, then enter @NOW–A1 in another cell when the student completed the test.

To see how this works, leave the cell pointer in cell B2, type **@NOW–B2**, press **<F9>**, and press **<Enter>**. The result appears as a time early in the morning. In fact, it's the elapsed time formatted to look like a time of day. Ignore the hours and a.m. part, and you'll see how many seconds or minutes passed between your first and second entries in cell B2.

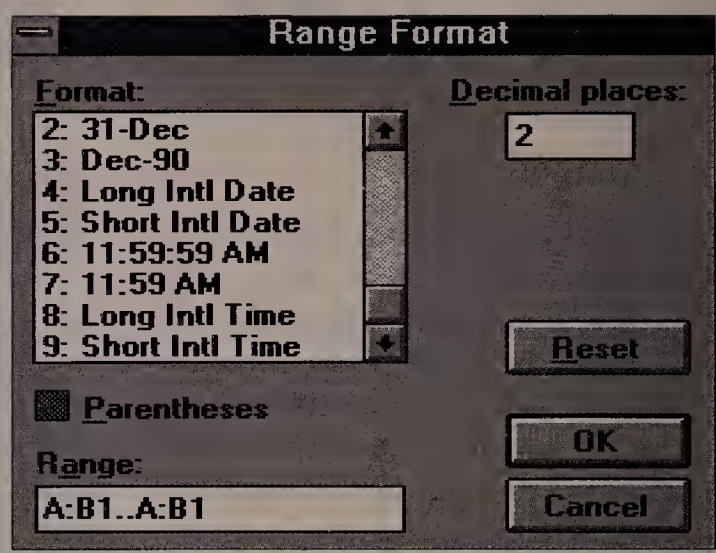


FIGURE 2: THE 1-2-3 FOR WINDOWS RANGE FORMAT BOX lets you select from a list of four Time formats.

Total Time Control

Another way to record a static time value is with the @TIME function. If you've kept a paper record of your transactions and the time of those transactions throughout the day, and at the end of the day you want to enter them in a *1-2-3* worksheet, @TIME can be a big help. The syntax of the function is @TIME(*hh,mm,ss*), and it returns a serial number from .000000 (midnight) to .999988 (11:59:59 p.m.). The hour argument for the @TIME function can be an integer from 0 to 23, where 0 represents midnight and 23 represents 11 p.m. The minute and second arguments can range from 0 to 59.

The drawback of @TIME is that it rec-

COMPUTERS FOR DEMOCRACY

EAST WEST
EDUCATION DEVELOPMENT FOUNDATION

MAKE A DIFFERENCE TO EMERGING DEMOCRACIES.

Your donated overstock, excess inventory, and outdated computer equipment are recycled by the East West Foundation to institutions that support democracy, where the need is great and where there is no budget to buy.

For information about donating computer equipment and cash:
East West
Education Development Foundation
49 Temple Place, Boston, MA 02111
(617) 542-1234; fax (617) 542-3333.

ognizes only military time. To record the time 1:35 p.m., you would enter the formula @TIME(13,35,0). To record 5:15 p.m., you'd enter the formula @TIME(17,15,0). Of course, you could also add the term *+12* after the hour term. Thus, to calculate the time serial number for 3:45 p.m., you could enter the formula @TIME(3+12,45,0).

An alternative to using @TIME and military time is to use the @TIMEVALUE function. @TIMEVALUE converts a string that looks like a time-formatted cell into the proper time serial number. To see how @TIMEVALUE works, move the cell pointer to B4, and enter **'5:06:32 PM**.

The entry looks like a formatted time serial number, but because it begins with an apostrophe, it's really a label that can't easily be used to calculate elapsed time. Now enter **@TIMEVALUE(B4)** in cell B5. Finally, assign the Time 1 format (in *1-2-3/W* the 6: 11:59:59 format) to cell B5 so that you can appreciate the result of the calculation.

You can also use @TIMEVALUE along with a quoted string to enter times. For example, enter **@TIMEVALUE("3:20:45 PM")** in cell B6. This formula returns 0.6394097, the serial number for 3:20 and 45 seconds in the afternoon.

1-2-3 release 3.*x* and *1-2-3/W* avoid many of these concerns by automatically converting entries that look like times into time serial numbers. For example, if you enter 4:05:55 PM into a worksheet cell, *1-2-3* will return the value 0.670775. Assign a Time format to the cell, and you're in business.

Breaking Apart Time

1-2-3 can also dissect a time serial number into hours, minutes, and seconds. The @HOUR, @MINUTE, and @SECOND functions are especially handy when you're not so interested in the time of day but need to calculate how long a task takes.

For example, enter the formula **@HOUR(B5)** in cell B7. It returns 17 (5:00 p.m. is the 17th hour of the day). Next, enter the formula **@MINUTE(B5)** in cell B8. It returns 6 because the time serial number in cell B5 shows that 6 minutes elapsed in the hour it represents. Finally, enter **@SECOND(B5)** in cell B9. This formula returns 32 because the entry in cell B5 shows 32 seconds.

Consider the elapsed time calculation we suggested earlier: Type **@NOW** into cell B10, press **<F9>**, and press **<Enter>**. Perform another task that takes at least a couple of minutes. When you've finished, return to cell B10.

Type **@NOW-B10**, press **<F9>**, and press **<Enter>**. How many hours, minutes, and seconds elapsed between the first entry and the last? The formulas @HOUR(B10), @MINUTE(B10), and @SECOND(B10) entered into three separate cells should be enough to tell you—unless the elapsed time is more than 24 hours. To calculate an elapsed time greater than 24 hours, see this month's *Q&A/Good Ideas* for a solution.

By Daniel Gasteiger

Daniel Gasteiger is a consultant specializing in spreadsheet applications and coeditor of The Spreadsheet Consultant, *a newsletter for power users published by Gasteiger & Delonas Incorporated in Boston.* ■

Lotus CBT Tutorials

Announcing New Computer Based-Training Tutorials for Lotus cc:Mail Users!

Just slip a Lotus CBT disk into your PC. An interactive window on your screen guides you through each operation while the background shows you what happens. You'll get product-specific, hands-on training on Lotus software. It's quick and easy!

Only $49.95

Lotus cc:Mail® 2.0
The latest release of cc:Mail software

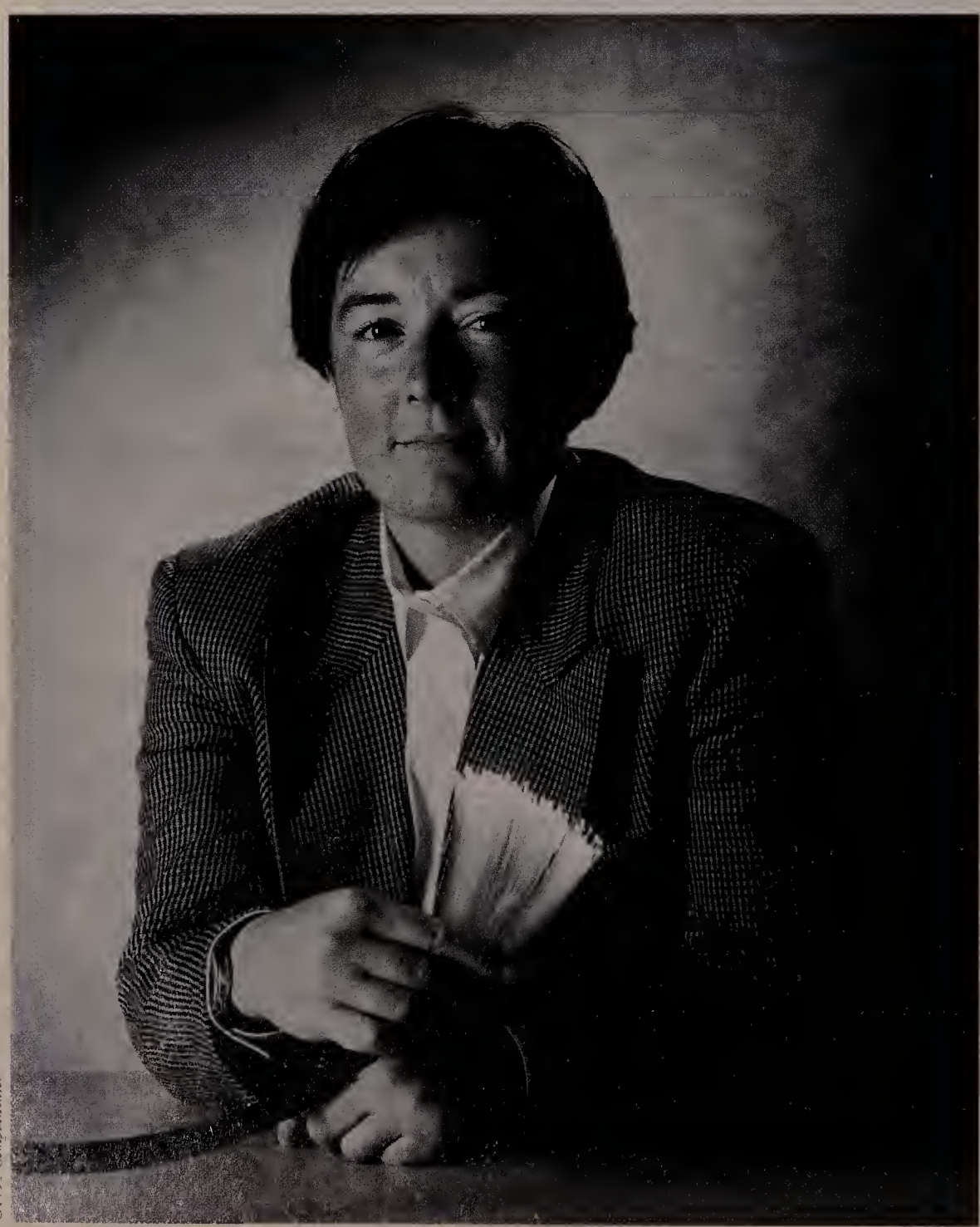
Lotus cc:Mail® 2.0 Remote*
The latest release of cc:Mail for remote software users

Order now, call Wayne Silverman at
617-422-8033

Lotus Publishing Corporation
77 Franklin Street, Suite 320, Boston, MA 02110
617-482-8634 Fax: 617-426-0235

• Available late summer
© 1993. Lotus Publishing Corporation. Lotus Publishing is an IDG Communications Company. Lotus cc:Mail 2.0 and Lotus cc:Mail 2.0 Remote are registered trademarks of Lotus Development Corporation.

Some people put the homeless out of their minds. Christine Vigil put them on-line.



©1991 CompuMentor

In 1906 St. Vincent de Paul was founded to help people left homeless by the San Francisco Earthquake. Today, they're an organization that helps thousands of homeless people nationwide. By finding them shelter, medical care, rehabilitation, and jobs.

That's where Christine came in. Before she got involved, St. Vincent de Paul worked with 75 other San Francisco social service agencies matching homeless people with available jobs. The Job Finders Alliance worked hard, but since they only communicated by memo and phone, it could take up to three weeks to match a qualified person with an open job.

By using her computer skills, Christine was able to put St. Vincent's on-line, and make the whole process more efficient. As a direct result of her efforts, today St. Vincent's has been able to find jobs for their people far more rapidly. And make better matches, because they have access to a comprehensive database.

Of course Christine is just one example. There are a lot of ways you can put your special computer skills to a much appreciated use, whether you specialize in telecommunications, system debugging, or basic software training. To know more, call CompuMentor™ at *1-800-659-3579.* We'll put you in touch with a local non-profit organization whose needs are compatible with your area of expertise.

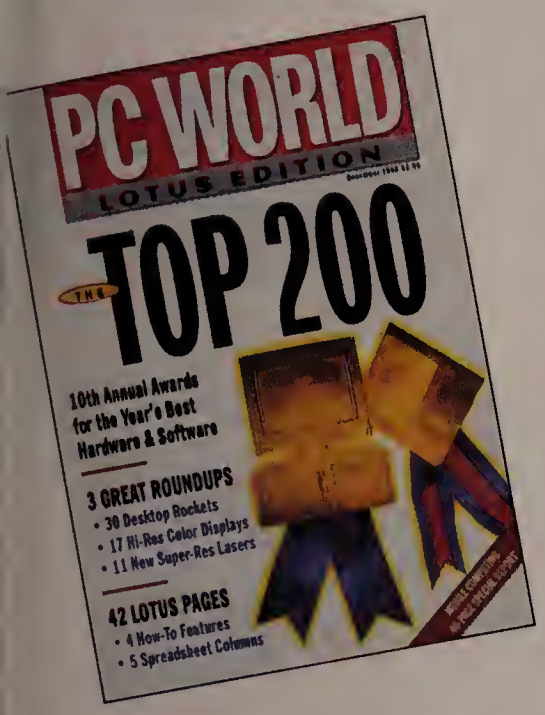
There are many ways to make a difference in the world. Sometimes it's simply doing what you already do best.

CompuMentor™

People helping computers help people.

89 Stillman Street, San Francisco, CA 94107

INTRODUCING PC WORLD LOTUS EDITION



Subscribe today and get the best of both worlds – **PC WORLD**, known for its great coverage of cutting-edge PC technology, along with a special **LOTUS section.** You'll get the same practical tips, ready-to-use applications and macro how-tos that you're used to seeing in LOTUS magazine. Together, they're guaranteed to help you maximize your productivity and business creativity.

Recycled Paper

SUPER SAVINGS!

YES! ☑ Please enter my subscription to the special **PC WORLD LOTUS EDITION** and bill me at the special rate of only $19.97 for 12 monthly issues – 58% off the newsstand rate, just $1.67 an issue.

Mail this card or call 800-825-7595 X501 • Fax: 415-882-0936

Name _____

Company _____

Address _____

City, State, Zip _____

PC WORLD LOTUS EDITION

Please allow 6 to 8 weeks for delivery of your first issue. Offer good only in the U.S. 42CE8

SUPER SAVINGS!

YES! ☑ Please enter my subscription to the special **PC WORLD LOTUS EDITION** and bill me at the special rate of only $19.97 for 12 monthly issues – 58% off the newsstand rate, just $1.67 an issue.

Mail this card or call 800-825-7595 X501 • Fax: 415-882-0936

Name _____

Company _____

Address _____

City, State, Zip _____

PC WORLD LOTUS EDITION

Please allow 6 to 8 weeks for delivery of your first issue. Offer good only in the U.S. 42CE8

SUPER SAVINGS!

YES! ☑ Please enter my subscription to the special **PC WORLD LOTUS EDITION** and bill me at the special rate of only $19.97 for 12 monthly issues – 58% off the newsstand rate, just $1.67 an issue.

Mail this card or call 800-825-7595 X501 • Fax: 415-882-0936

Name _____

Company _____

Address _____

City, State, Zip _____

PC WORLD LOTUS EDITION

Please allow 6 to 8 weeks for delivery of your first issue. Offer good only in the U.S. 42CE8

NO POSTAGE
NECESSARY
IF MAILED IN
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS MAIL PERMIT NO. 1262 BOULDER, CO

POSTAGE WILL BE PAID BY ADDRESSEE

PC World Lotus Edition
Subscription Department
P.O. Box 55011
Boulder, Colorado 80321-5011

NO POSTAGE
NECESSARY
IF MAILED IN
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS MAIL PERMIT NO. 1262 BOULDER, CO

POSTAGE WILL BE PAID BY ADDRESSEE

PC World Lotus Edition
Subscription Department
P.O. Box 55011
Boulder, Colorado 80321-5011

NO POSTAGE
NECESSARY
IF MAILED IN
UNITED STATES

BUSINESS REPLY MAIL

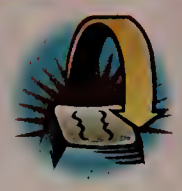
FIRST CLASS MAIL PERMIT NO. 1262 BOULDER, CO

POSTAGE WILL BE PAID BY ADDRESSEE

PC World Lotus Edition
Subscription Department
P.O. Box 55011
Boulder, Colorado 80321-5011

SUBSCRIBE TODAY!

Let Users Know What Your Macro Is Doing



Waiting for a long macro to complete its task can be frustrating, and not knowing what's going on behind the scenes can be intimidating. *1-2-3* displays the CMD indicator at the bottom of the screen when a macro is running, but that's your only clue. Fortunately there is a command that can shed light on what your macro is doing. By adding {INDICATE} to your macros, you can control what *1-2-3* displays in the mode indicator and create more informative applications.

```
      A          B          C          D          E
1   \a         {INDICATE "Optimization Macro running"}
2
3   \b         {FOR counter,1,@ROWS(list),1,check}~
4
5   check      {IF @CELLPOINTER("type")<>"v"}@NA~
6              {DOWN}{RECALC progress}
7   progress   {INDICATE Macro has processed 0%}
8
9   counter
10
11  \c         {GETNUMBER "Enter sales amount: ",amt}~
12             {IF amt<100}{msg}{BRANCH \c}
13
14  msg        {BEEP}{BEEP}{BEEP}
15             {INDICATE "Value must be greater than or
               equal to 100. Press any key to continue."}
16             {GET key}
17  \d         {INDICATE}
18
19  amt
20
21  key
```

Located at the right end of the format line in the control panel, the mode indicator tells you what operation *1-2-3* is performing. For example, *1-2-3* displays 'READY' when the program is ready for you to enter data or choose a command, 'EDIT' when you're editing the contents of a cell, and 'WAIT' when it's completing a command or process, such as saving a file.

{INDICATE} lets you replace the standard *1-2-3* mode indicator with a string you specify. This string can be an application name, a custom prompt, or a message. The string remains on screen until *1-2-3* encounters another {INDICATE} command, you erase the current worksheet, or, in release 2.*x*, you retrieve another worksheet.

The syntax of the command is {INDICATE *string*}. *String* is optional and can contain 240 characters, although *1-2-3* will display only as many as fit on the first line of the control panel. The exact number depends on the release you use. *String* can be any text enclosed in quotation marks, the address or name of a cell that contains a string, or the address or name of a cell that contains a formula that returns a string. An {INDICATE} command whose argument is an empty string—{INDICATE ""}—removes the mode indicator. An {INDICATE} command with no argument restores the standard *1-2-3* display.

Enter the labels in the figure, excluding the entry in cell B7. We display the label in B15 on two lines, but you should enter it on one line. Assign the labels in column A as range names for the adjacent cells in column B. Enter a list of labels and numbers in range A25..A45, and assign it the name List. In cell B7 enter the following formula:

+"{INDICATE Macro has processed"&@STRING (counter/@ROWS(list)*100,0)&"%}"

To run a macro, press **<Alt>** (**<Ctrl>** in *1-2-3/W*) and the appropriate letter name.

Sometimes the name of the macro that's running is all you need to know. If your macro is made up of several subroutines, you may want to know which routine is running. The \A macro displays 'Optimization Macro running' in the mode indicator.

Sometimes it's helpful to know how much progress a macro has made. The \B macro uses {INDICATE} to show the percentage of the macro *1-2-3* has processed. The macro tests each cell in a range named List. If the cell contains a label, the macro enters @NA in the cell. If it contains a value, the macro moves on to test the next cell. Position the pointer in cell A25 and invoke the macro; it executes a FOR loop for each entry in List. At the end of each loop, *1-2-3* displays a message indicating how many cells in List the macro has tested.

What Now?

Perhaps the best use of {INDICATE} is to improve your macro's prompts. To let a user know how to stop a macro while it's running, you might include the command {INDICATE "Press <Ctrl>-<Break> to end macro"}. To prompt the user to execute other macros, use a command such as {INDICATE "Press <Alt>-I to input more records or <Alt>-S to save file"}.

The {INDICATE} command in the \C macro lets you know when you've entered an incorrect amount in response to the {GETNUMBER} command. If you enter an amount equal to or greater than 100, the macro enters that value in the cell named Amt, restores the mode indicator, and ends. If you enter an amount less than 100, the macro calls the Msg routine, which tells *1-2-3* to beep, display the message 'Value must be greater than or equal to 100', branch back to the beginning of the macro, and prompt you for another amount.

By adding {INDICATE} commands to your macros, you can make them less threatening and more informative.

By Cynthia G. Fitzgerald

Models on Disk Includes the models, macros, or formulas contained in this article. See page L10 for details. This material is also available on CompuServe and from PC World Online.

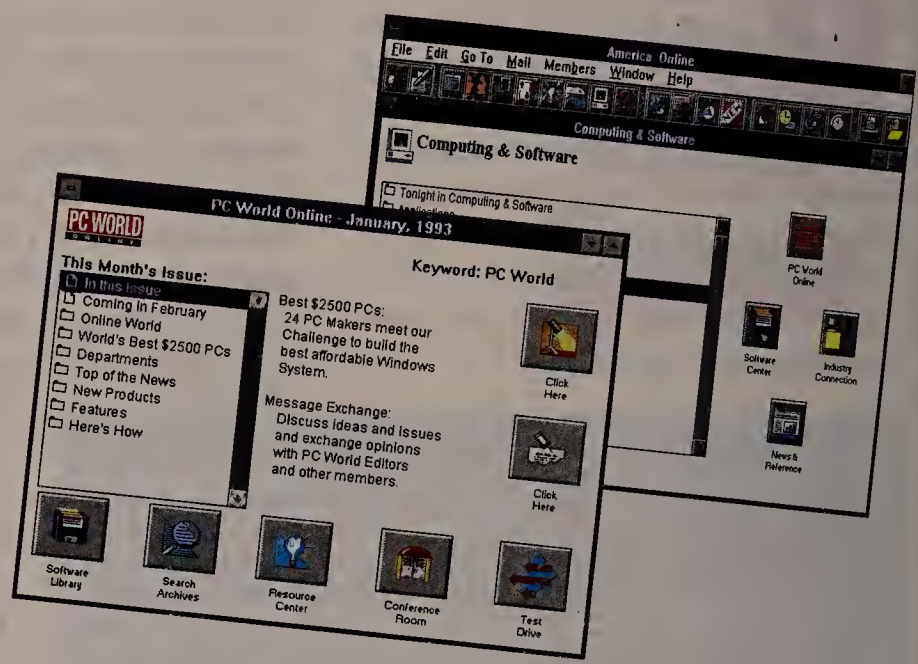
NOW AVAILABLE FOR DOS *AND* MICROSOFT WINDOWS™

PC WORLD ONLINE: IT'S SO GOOD, IT'S FREE.

ACCESS TO THE EXCITING ONLINE VERSION OF PC WORLD IS JUST TWO SNIPS AWAY.

Clip and return this coupon, and we'll send you – absolutely free – everything you need to start using PC WORLD Online, the exciting online service brought to you by PC WORLD Magazine and America Online.

We're so sure you'll love PC WORLD Online, we'll give you the software you need to get started, a free trial membership and five free hours of connect time – so you can explore this fascinating online world of information and expert computing advice with no obligation.



GET IN TOUCH WITH PC WORLD ONLINE.

From the opening screen, PC WORLD Online gives you the kind of information, programs, forums, and data you need. Everything from databases of computer products to downloadable software and utilities specifically selected by the PC WORLD editors.

Use a search word to check back issues for product reviews. Download this month's top ten public-domain software programs. Or get "In Touch with PC WORLD," to send news and opinions directly to the staff. Leave messages for other PC WORLD Online subscribers. Got a problem? Get the advice you need here.

And you can access hundreds of other entertaining and useful services through America Online. Send and receive electronic mail with ease. Get nightly homework help for the kids. Join special interest groups and clubs. Save time and money shopping. Find and book the lowest airfares. Just point and click to navigate using our lively, graphical interface, with colorful icons, pull-down menus, and powerful features and shortcuts.

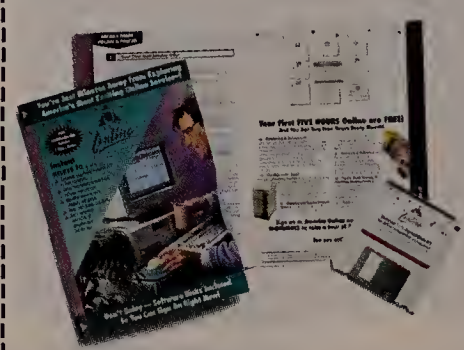
DON'T DELAY — ORDER YOUR FREE SOFTWARE NOW!

Find those scissors, clip the coupon, and get ready to enter an exciting new world of computing with PC WORLD Online.

Circle 207 on reader service card

RESPOND BY JUNE 30! FIVE HOURS OF ONLINE TIME – FREE!

❑ YES! Send me the free software and trial membership. I understand there's no risk — if I'm not completely satisfied, I may cancel without further obligation.



NAME

ADDRESS

CITY

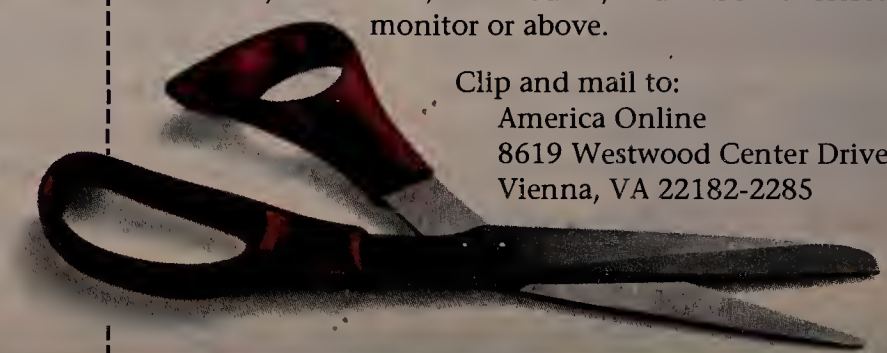
STATE ZIP

( )
HOME PHONE

DISK TYPE AND SIZE: ❑ 3.5 ❑ 5.25
❑ HIGH DENSITY ❑ DOUBLE DENSITY
❑ NEW! WINDOWS VERSION!

The DOS-compatible version of PC WORLD Online requires ❑ a PC/XT or higher; ❑ 512K memory or higher; ❑ a hard drive; ❑ a mouse; ❑ a modem; and ❑ EGA or Hercules monitor or above.

Clip and mail to:
America Online
8619 Westwood Center Drive
Vienna, VA 22182-2285



7252

File Commands Open New Doors for Data

The file-manipulation commands in *1-2-3* may be just what you need to swap information between files. Macros that tap these commands can open a new file and send text to it, thus creating a simple ASCII file. Or they can open an existing worksheet, jump to a position within the file, and read a specific number of characters into the worksheet. File-manipulation commands can also modify existing files, either by adding characters at the end of the file or by replacing characters within the file. This month we'll show you how to exploit these powerful capabilities, which are available in *1-2-3* release 2.*x* and later releases.

File-manipulation commands let you create files, modify files, and read data from an ASCII file.

Before we look at the commands individually, you should be aware of the quirk that they all have in common: Instructions that accompany a file-manipulation command in the same cell are ignored unless the command fails. If you tend to shorten macros by combining commands in one cell, don't indulge this habit when you're using any of these commands.

For example, if you want a macro to open a tax data file and then display the message 'Reading Tax Data File' in the mode indicator, don't combine the {OPEN} and {INDICATE} commands in one cell. If the macro does open the specified file, it will skip the {INDICATE} command entirely and proceed to the next line of code.

This may seem a strange way for macro commands to behave, but there's an upside: These commands have a built-in error-checking mechanism. If you want your macro to branch to an error-message routine if it can't open a file, *do* combine the {OPEN} and {BRANCH} commands in one cell, as in the command: {OPEN "tax.dat",R}{BRANCH nofile}.

Because the {BRANCH} command is processed only if the {OPEN} command fails, there's no need for an {IF} statement that checks to see if the operation didn't work. Keeping this in mind, let's consider the nine file-manipulation commands.

The {OPEN} Command

No surprise here: This command opens files. Only one text file can be open at a time. If a text file is open when *1-2-3* performs the {OPEN} command, *1-2-3* closes that file before it opens the new one.

The syntax of the command is {OPEN *filespec, type*}. The *filespec* argument is the complete path name of the file to be opened (in quotation marks), a reference to a cell that contains the path name, or the result of a formula that returns the name.

Type indicates what you want to do with the open file. A *type* argument of W (for write) tells *1-2-3* to open a new file and prepare to send characters to it. If *filespec* names an existing file, the contents of that file will be erased. If *filespec* names a file that cannot be created—for example, if one of the directories in the path does not exist—the {OPEN} command fails.

When you use R (for read only) as the *type* argument, *1-2-3* opens an existing file and prepares to read its first characters into the worksheet. A macro cannot write characters to a read-only file. A *type* argument of A (for append) tells *1-2-3* to open an existing file and prepare to append characters to the end of the file. When you use M (for modify), {OPEN} opens an existing file and prepares either to read its first characters or write new characters to the beginning of the file, overwriting existing characters. If the specified file doesn't exist and you've indicated a *type* of R, A, or M, the {OPEN} command will fail.

The {CLOSE} Command

1-2-3 doesn't automatically close an open file when a macro ends. To close the file and save any changes that you made, you must include the {CLOSE} command. {CLOSE} takes no arguments. If a macro invokes the {CLOSE} command when no file is open, the command has no effect. By definition, the {CLOSE} command is always successful. Therefore, you should never follow {CLOSE} with other instructions in the same cell.

The {SETPOS} Command

If you want to reposition the byte pointer within a file, include the {SETPOS} command in your macro. The syntax of this command is {SETPOS *x*}, where *x* is a value that indicates a position in the file, a formula that returns a value, or a reference to a cell that contains a value or formula. The first character in the file is considered position 0; a negative value is the same as 0.

For example, if you follow the command {SETPOS 80} with an instruction to read the next 120 characters in the file, the macro will read from the 80th character to the 200th character.

The {GETPOS} and {FILESIZE} Commands

If you want your macro to mark its place in a file after it has found a particular string of characters, use the {GETPOS} command. The syntax of the command is {GETPOS *target*}. The {GETPOS} command determines the current position of the byte pointer within a file and stores that position as a value in *target*. Again, the first position in a file is 0, not 1. The {GETPOS} command also lets you track how many characters a macro has read from an open file.

{FILESIZE *target*} counts the number of bytes in an open text file and stores the number in *target*. Use the {FILESIZE} command with the {SETPOS} command when you want to position the byte pointer at the end of a file.

The {READ} and {READLN} Commands

{READ *n,target*} reads *n* number of characters from a file and copies them to *target*. Unless preceded by a {SETPOS} command that selects a starting point within the file, the first {READ} command will read the first *n* characters, the second will read the next *n*

characters, and so on. {READ} copies carriage-return and line-feed characters that occur with blocks of characters.

The {READ} command stores only as many characters as a cell will hold—240 in release 2.*x*, 511 in *1-2-3* release 3.*x* and *1-2-3 for Windows*—and it advances the byte pointer by the same number. However, an *n* value higher than 240 or 511 will not trigger an error condition.

{READLN *target*} reads an entire line of text and copies it to *target*. It reads from the current position of the byte pointer until it reaches a carriage-return/linefeed character combination (ASCII character 13 followed immediately by ASCII character 10) or until it reaches a cell's character limit. {READLN} does not copy the carriage return and linefeed into *target*.

The {GETPOS}, {FILESIZE}, {READ}, and {READLN} commands change the contents of cells in the worksheet. But after performing one of them, *1-2-3* does not automatically recalculate formulas that depend on these cells. You must do so by beginning the next line of the macro with a tilde (~) or the {CALC} command.

The {WRITE} and {WRITELN} Commands

{WRITE *string*} copies the characters in *string* to an open text file. *String* can be a string, a formula that returns a string, or a reference to a cell that contains a string or a string-returning formula. It cannot exceed 240 characters in release 2.*x* or 511 characters in release 3.*x* or *1-2-3/W*.

{WRITELN *string*} copies the characters in *string* followed by a carriage-return/linefeed character combination to an open text file. {WRITE} and {WRITELN} begin copying *string* at the current position of the byte pointer. Unless the pointer is at the end of the file, *string* will overwrite existing characters, including carriage-return/linefeed characters.

Task One: Does a File Exist?

The handiest use for the file-manipulation commands is finding out if a particular file already exists. Suppose you write a macro that prompts the user for a file name and then uses either a File command to save all or part of the worksheet or the Print•File command to export text.

If you do not want the macro to replace an existing file, put the instructions /FS or /PF in the same cell positioned after the {OPEN} command. If you're working in *1-2-3/W*, include the commands {MB}FS, {MB}FA (for File•Save As), or {MB}FE (for File•Extract to) in your macro.

That way, the macro creates a file only if the file doesn't already exist (because the macro executes the commands only if {OPEN} is unsuccessful).

Task Two: Exporting Labels

Many programmers use the Print•File commands in macros when they want to export a column of worksheet labels to a text file. These instructions tell *1-2-3* to print the text to a file instead of to a printer. However, when you create an unformatted ASCII file (using no margins and no empty rows for skipping over page breaks) with these commands, the macro has to change printer settings. Furthermore, when you print long labels to a file, your Print range must include the columns into which the labels extend, and these columns must in turn be empty. You can eliminate these potentially frustrating drawbacks if you write each label in the Print range to a file by using the {WRITELN} command.

The \X macro shown in **FIGURE 1** does this for you. This macro calls the Export subroutine and passes two arguments to it: the range address A1..A4 and the file name ADDRESS.TXT. If you want the macro to export a named range, pass that name to the subroutine. If you want to store the file in a directory other than the one you're in, include the complete path name in the file name argument.

The first command in the Export subroutine stores the range address or name and the file name in the cells named Exprange and Exptarg. The {IF} command in cell B9 checks to see if the label in Exprange is an invalid range address or name, in which case it halts the macro.

You can replace the {QUIT} command with a call to an error-handling routine of your own. The {OPEN} command in cell B10 opens the file named in Exptarg and prepares to send characters to it. If the {OPEN} command fails, the macro stops. Again, you can use your own error-trapping routine instead of {QUIT}.

The command in cell B11 starts a FOR loop that calls the instruction in cell B19, which in turn writes a row of text to the target file, one time for each row in the export range. Finally, the command located in cell B12 closes the file. The file named ADDRESS.TXT is created and then stored in the current directory.

```
      A        B        C        D        E        F
1  PC World Lotus Edition
2  77 Franklin Street
3  Suite 300
4  Boston, MA 02110
5
6  \x              {export A1..A4,address.txt}
7
8  export          {DEFINE exprange,exptarg}
9                  {IF @ISERR(@@(exprange))}{QUIT}
10                 {OPEN exptarg,W}{QUIT}
11                 {FOR expct,0,@ROWS(@@(exprange))-1,1,expline}
12                 {CLOSE}
13
14 exprange
15 exptarg
16
17 expct
18
19 expline         {WRITELN @INDEX(@@(exprange),0,expct)}
```

FIGURE 1: THE EXPORT SUBROUTINE tells 1-2-3 to export a column of labels to an ASCII file. In this example, range A1..A4 is exported to the file ADDRESS.TXT.

Task Three: Importing ASCII Files

The \I macro in **FIGURE 2** imports an ASCII file that has a carriage return at the end of each paragraph but not at the end of each line. If you try to import such a file with the File•Import•Text command, you'll receive the error message 'Input Line Too Long'. To get around this, the macro employs the {READ} command to bring the file into the worksheet in 72-character blocks.

Before you run this macro, place the cell pointer where you want the data to start. The macro checks each block for ASCII character 13, which indicates the end of a paragraph. If it finds character 13, it calls the Endpara subroutine, which truncates the label at the position of that character.

If there is no carriage return, the macro calls the Endline subroutine to find the last space in the label and truncates the label there.

Before reading in each new block, the macro calls the Advance subroutine, which increments the value stored in Position by the number of charaeters in the truncated label, and then uses the @CLEAN function to strip out formatting characters created by the software that generated the file. The main routine uses the value in Position in the {SETPOS} command to set the byte pointer.

Notice the {IF} command in cell S21. It determines whether a 72-character block begins with a carriage return (that is, whether it is a null string). If it is a null string, *1-2-3* erases the current cell and terminates the subroutine.

Otherwise, *1-2-3* executes the command in cell S22, which moves the cell pointer to the next cell, erases any entry there, and moves the cell pointer down again.

The instruction in cell S27 allows for blocks that contain no spaces. If the macro hits one of these blocks, the FOR loop's counter is decremented all the way to 0. In that case, the Endline routine doesn't truncate the cell (though it does strip out the formatting characters). This mechanism is useful when a file contains long, unbroken character strings meaningful only to the program that created it.

The file-manipulation commands increase the number of ways macros can store data, and they increase the number of sources from which macros can get data. In many cases they free you from having to translate files before you can use them. And they let you store results outside of a worksheet, which may keep the worksheet from growing to an unusably large size.

Although commands that manipulate files at the single-byte level can sometimes be tricky to use, the results can be well worth your time and energy.

By Richard Cranford

Models on Disk includes the models, macros, or formulas contained in this article. See page L10 for details. This material is also available on CompuServe and from PC World Online.

```
     R        S      T      U      V      W      X      Y      Z      AA     AB
1  \i          {GETLABEL "Enter path and name of file to import: ",fspec}
2              {PANELOFF}{WINDOWSOFF}{LET position,0}
3              {OPEN fspec,R}{QUIT}
4              {FILESIZE size}
5  nxtline     {IF position>size}{BRANCH endfile}
6              {SETPOS position}
7              {READ 72,@CELLPOINTER("address")}
8              {IF @FIND(@CHAR(13),@CELLPOINTER("contents"),0)+1}{endpara}{BRANCH nxtline}
9              {endline}
10             {BRANCH nxtline}
11
12 fspec
13 size
14 position
15
16 endfile     {CLOSE}
17
18 endpara     {LET crpos,@FIND(@CHAR(13),@CELLPOINTER("contents"),1)}
19             {LET @CELLPOINTER("address"),@LEFT(@CELLPOINTER("contents"),crpos)}
20             {advance}
21             {IF @LENGTH(@CELLPOINTER("contents"))=0}{BLANK @CELLPOINTER("address")}{RETURN}
22             {DOWN}{BLANK @CELLPOINTER("address")}{DOWN}
23
24 crpos
25
26 endline     {FOR linelen,72,0,-1,findword}
27             {IF linelen>0}{LET @CELLPOINTER("address"),@LEFT(@CELLPOINTER("contents"),linelen)}
28             {advance}{DOWN}
29
30 linelen
31
32 findword    {IF @MID(@CELLPOINTER("contents"),linelen,1)=" "}{FORBREAK}
33
34 advance     {LET position,position+@LENGTH(@CELLPOINTER("contents"))+1}
35             {LET @CELLPOINTER("address"),@CLEAN(@CELLPOINTER("contents"))}
```

FIGURE 2: IMPORT AN ASCII FILE that doesn't contain carriage-return/linefeed combinations with this macro.

To tap into the power of Lotus Software, you need the official Lotus Videos.

Produced in collaboration with Lotus Publishing Corp., Lotus Development Corp., and LEARN PC, the industry leader in personal computer training, each exciting, information-packed video makes learning new Lotus skills fun and easy.

See for yourself. Load one into your VCR. Then press Play. Each of our Lotus Videos will take you on an insightful, half-hour tour of Lotus software while you follow along on your PC. Detailed illustrations, keyboard closeups, and computer screen shots, show you how your software reacts to commands — and how to reach beyond the basics to harness the awesome power of Lotus.

PC JOURNAL EDITORS' CHOICE

The Official Lotus Videos

Order these Lotus Videos

- 1-2-3 with WYSIWYG, Releases 2.3, 3.1, And 3.1+: Intermediate Skills
- Ami Pro 3.0: Introductory Skills
- Ami Pro 3.0: Intermediate and Advanced Skills
- Freelance Graphics for Windows 2.0
- The Power of Linking Spreadsheets
- 1-2-3 Release 2.4: Introductory Skills
- 1-2-3 Release 2.4: Intermediate and Advanced Skills
- 1-2-3 Release 2.2 Intermediate Skills: How to Link Your Spreadsheets
- 1-2-3 Release 2.2 Intermediate Skills: How to Use the Allways Feature
- Using the Power of Allways
- Getting Started with 1-2-3 Release 2.3
- Getting Started with Ami Pro 2.0
- Ami Pro 2.0: Intermediate and Advanced Skills

$49.95 each
$59.95 Canada

Call
1-800-824-5520
Outside the U.S., call
1-410-546-0191

LOTUS VIDEOS
Lotus Publishing Corporation
P.O. Box 1743, Salisbury, MD 21802

Exclude Zeros, Convert Dates, Split Names

Excluding Zeros in Calculations

Q I'm having trouble calculating the minimum and average values for a series of job costs when the costs include zeros. For example, the following figure contains the costs per unit (range B2..E2) and the costs per square foot (range B3..E3) of four jobs.

I need to write formulas that will exclude zeros. Can you help me?

Anne B. Gehlsen, Tampa

A	A	B	C	D	E
1	Job	1	2	3	4
2	Cost per Unit	100	0	250	259
3	Cost per Sq Ft	25	37	0	40

A When you want to perform calculations on a subset of items in a database—in your case, items that are greater than zero—use *1-2-3*'s database statistical, or @D, functions.

There are several @D functions, but they all have the same syntax. They each take three arguments: *input*, *offset*, and *criteria*. The *input* argument is the address or name of the range that contains your database. The database must be arranged so that each column represents a field and each row a record.

The *offset* argument is the number of the database column you want to analyze, counting right from the first column in the database. The first column is offset 0, the second column is offset 1, and so on.

The *criteria* argument is the name or address of a range that contains at least two rows. The top row of the Criteria range contains one or more field names from the Input range; they must match the database names exactly. The second row contains the formulas that tell *1-2-3* which records to select, with each formula below the name of the field it applies to.

In your example, begin by organizing your data as shown

A	A	B	C
1	Job	Cost per Unit	Cost per Sq Ft
2	1	100	25
3	2	0	37
4	3	250	0
5	4	259	40

in the figure above. Then set the width of columns B, C, and E to 15.

Range A1..C5 is the Input range: The field names are in range A1..C1, and the records are in range A2..C5. Since you want to calculate the minimum and average of selected records for two different fields, you need to create two Criteria ranges, one for each field.

To do this, copy cell B1 to cell E1 and cell C1 to cell E4. Enter **+B2<>0** in cell E2 and **+C2<>0** in cell E5. The formulas tell *1-2-3* to exclude a record if its value in either field equals zero.

The Criteria range for the formulas that calculate minimum and average costs per unit is range E1..E2, and the Criteria range for the formulas that calculate the minimum and average costs per square foot is range E4..E5.

Now, enter the labels shown in range F1..G1 in the following figure. Copy the labels in range F1..G1 to cell F4.

To calculate the minimum and average costs per unit, excluding any cell that contains zero, enter the following formulas in the cells indicated:

CELL	FORMULA
F2	@DMIN(A1..C5,1,E1..E2)
G2	@DAVG(A1..C5,1,E1..E2)

A	E	F	G
1	Cost per Unit	Min	Avg
2	1	100	203
3			
4	Cost per Sq Ft	Min	Avg
5	1	25	34

To calculate the minimum and average costs per square foot, enter the following formulas in the cells indicated:

CELL	FORMULA
F5	@DMIN(A1..C5,2,E4..E5)
G5	@DAVG(A1..C5,2,E4..E5)

GOOD IDEA

Calculate Elapsed Time

Suppose you're conducting an experiment that may run for several days and you need to know the number of hours and minutes between the start of the experiment and the time you receive its results. To record accurate starting and ending times, you must include both the time and the date.

To follow the discussion, set the width of columns A and C to 10 and the width of columns B and D to 14. Next, enter the labels in range B1..D1 and A2..A5 of the figure below.

In cell B2, enter the formula @DATE(93,6,1)+@TIME(9,0,0) to represent the starting date and time—June 1, 1993, 9 a.m. In cell B3, enter the formula @DATE(93,6,3)+@TIME(16,30,0) to represent the ending date and time—June 3, 1993, 4:30 p.m.

Copy range B2..B3 to range C2..D3 and use the Range • Format command to assign the Date 1 format to range C2..C3. Use the same command to assign the Time 1 format to range D2..D3. Enter the formula +B3-B2 in cell B4 to calculate the serial number for the elapsed time.

Finally, enter the following formula in cell D5: @STRING(@INT(B4)*24+@HOUR(B4),0)&":"&@STRING(@MINUTE(B4),0).

A	A	B	C	D
1		Serial Number	Date	Time
2	Start	34121.375	01-Jun-93	09:00:00 AM
3	Stop	34123.6875	03-Jun-93	04:30:00 PM
4	Difference	2.3125		
5	Time Elapsed>>>>>>>>>>>>>>			55:30

This formula returns a string indicating the total elapsed time in the experiment: 55 hours and 30 minutes from start to finish.

Daniel Gasteiger, Boston

Convert Serial Dates to Julian Dates

Q In the February issue [page 114-L37], Joel R. Steine asked how to convert a date serial number in *1-2-3* to a five-digit Julian date, in which the first two digits represent the year and the last three digits the day of the year. I came up with a formula shorter than the one you provided.

To see how it works, enter the labels in row 1 of the figure in the next column. Use the @DATE function to enter the dates in range A2..A4. For example, in cell A2, enter **@DATE(90,12,20)**. Select */Range•Format•Date•1* to assign the Date 1 format to range A2..A4. Set the width of column A to 10.

Enter the following formula in cell B2

A	A	B	C
1	Date	Julian Date	
2	20-Dec-90	90354	
3	01-Feb-92	92032	
4	01-Jan-93	93001	

and copy it to range B3..B4: **1000*@YEAR(A2)+(A2–@DATE(@YEAR(A2),1,1)+1)**.

Gar Yee, Los Angeles

A Thanks to all the readers who sent shorter formulas.

Separate a Name Into Two Cells

Q I have a list that contains first names and last names in a single cell. Is there an easy way to separate the first and last names into two cells?

Charles E. Wexler, Tarzana, California

A Enter the labels shown in range A1..A4 of the figure on the next page. Set the width of column A to 19 and the width of column B to 11.

Next, enter the following formulas in the cells indicated and then copy range B1..C1 to range B2..B4:

CELL	FORMULA
B1	@LEFT(A1,@FIND(",",A1,0))
C1	@MID(A1,@FIND(",",A1,0)+2,240)

The formula in cell B1 uses the @LEFT function to return all the characters in cell

February Contest Results

Calculate Maximum Number of Days

In the February issue, we asked users of *1-2-3* and *Symphony* to submit the best method for calculating the maximum number of days required to complete a project. In the figure below, column A contains values representing the start date of each project. Columns B, C, and D contain values representing three different completion dates.

A	A	B	C	D	E	F
1	Start	End_1	End_2	End_3		Max
2	920205	920206	920211	920208		6
3	920307	920417	920406	920331		41
4	920405	920507	920609	920715		101

We asked for a solution that returns the results shown in column F, the number of days between the start date and the latest completion date. The winning solution is a single formula you can enter in cell F2 and copy to range F3..F4: @DATE(@MAX(B2..D2)/10000,@MOD(@MAX(B2..D2)/100,100),@MOD(@MAX(B2..D2),100))–@DATE(A2/10000,@MOD(A2/100,100),@MOD(A2,100)).

Determining the number of days between two dates is easy in *1-2-3* and *Symphony:* Just subtract the serial number of the start date from the serial number of the end date. The challenge in this case is to perform calculations with values that aren't date serial numbers. In range A2..D4, the first two digits of each value represent the year number, the third and fourth digits the month number, and the last two digits the day number. For example, the entry in cell A2, '920205', represents February 5, 1992.

The winning formula contains two @DATE expressions to convert the latest completion date and the start date to serial numbers. @DATE(*year,month,day*) returns the date serial number for the specified year, month, and day. The *year* argument can be any integer from 0 to 199. 0 represents the year 1900 and 199 represents the year 2099. The *month* argument can be any integer between 1 and 12. 1 represents January and 12 represents December. The *day* argument can be any integer between 1 and 31.

The first part of the formula, @DATE(@MAX(B2..D2)/10000,@MOD(@MAX(B2..D2)/100,100),@MOD(@MAX(B2..D2),100)), returns the date serial number of the latest completion date. The expression @MAX(B2..D2)/10000 returns the maximum value in range B2..D2 divided by 10000. The result, 92.0211, is the *year* argument. The expression @MOD(@MAX(B2..D2)/100,100) calculates the *month* argument. It divides the maximum value in range B2..D2 by 100 and returns the remainder of that value divided by 100, which is 2.11. The expression @MOD(@MAX(B2..D2),100) returns the remainder of the maximum value in range B2..D2 divided by 100, which is 11, the *day* argument. The @DATE function ignores the decimal portion of a value used as an argument, so this part of the formula evaluates to @DATE(92,2,11). It returns the date serial number of February 11, 1992.

The second part of the formula, @DATE(A2/10000,@MOD(A2/100,100),@MOD(A2,100)), calculates the date serial number of the start date. The expression +A2/10000 returns the *year* argument, which is 92.0205; the expression @MOD(A2/100,100) returns the *month* argument, 2.05; and the expression @MOD(A2,100) returns the *day* argument, 5. This part of the formula evaluates to @DATE(92,2,5). It returns the date serial number of February 5, 1992.

The formula subtracts @DATE(92,2,5) from @DATE(92,2,11) to return the maximum number of days required to complete the first project—6.

The following readers submitted winning entries: Seyed M. Ashrafi, Duluth, Georgia; Kevin Beggs, Brockton, Massachusetts; Gary L. Bogolin, Elk Grove Village, Illinois; Shane Devenshire, Walnut Creek, California; Daniel B. Furlong, San Rafael, California; David C. Klages, De Kalb, Illinois; Kevin Larsen, Highlands Ranch, Colorado; Minh Le, Bakersfield, California; J. Reid McTaggart, Houston; Maria Potiris, West Palm Beach, Florida; David Richardson, Topanga, California; Thomas F. Ryan, Spreckels, California; Dennis A. Smelko, Indiana, Pennsylvania; David H. Sperling, New York; Roger L. Strong, Plano, Texas; and Diane Tverberg-Bina, Bloomington, Minnesota.

A	A	B	C
1	Mayer, Kathy	Mayer	Kathy
2	Lewis, Ruth L.	Lewis	Ruth L.
3	Smith, Liz Ann	Smith	Liz Ann
4	Alexander, H. P.	Alexander	H. P.

A1 up to, but not including, the comma. @LEFT(*string,n*) returns the first *n* characters in *string* (in this example, the label in cell A1). The *n* argument, the expression @FIND(",",A1,0), returns the position number of the comma in the label in cell A1. The syntax of the @FIND function is @FIND(*search,string,number*). @FIND calculates the first occurrence of *search* within *string*, which can be a label, a reference to a cell that contains a label, or a formula that evaluates to a string. The program begins the search at the position indicated by *number*. Numbering begins with zero. The formula returns ERR if *1-2-3* can't find *search* within *string*. Keep in mind that this function is case sensitive.

In this example, @FIND(",",A1,0) returns 5, so @LEFT(A1,5) returns 'Mayer'.

The formula in cell C1 uses the @MID function to return all the characters that follow the space after the comma. The formula @MID(*string,start,n*) returns *n* characters in *string*, beginning with the character at *start*. (In this example, the *string* argument is the label in cell A1.) The *start* argument is the expression @FIND(",",A1,0)+2, which identifies the character two positions to the right of the comma. To make sure the formula returns all the characters in *string*, the *n* argument is 240.

In this case, @FIND(",",A1,0)+2 returns 7, so @MID(A1,7,240) returns 'Kathy'.

File Name in Footer

Q I use *1-2-3* release 2.4 with the Wysiwyg add-in attached, and I'm having trouble creating a footer that contains text along with the file's complete path and name. Can you tell me how to get *1-2-3* to print the current file name automatically in the footer or header?

Mary M. Litz, Columbia, Maryland

A The formula @CELL("filename",B1) returns the complete path and name of the current file. Simply enter the formula along with the footer text in any blank cell in the worksheet, and then refer to that cell when you specify the footer. In *1-2-3* release 2.2 and higher, if you enter a backslash followed by a cell address or a range name as a header or footer, *1-2-3* prints the contents of the cell in the header or footer. If you use the name of a multicell range, *1-2-3* prints only the contents of the top left corner cell of the range.

For example, enter the following formula in cell A1: **+"Prepared by KMS Finance "&@CELL ("filename",B1)**.

If the current file name is JUNE.WK1 and it's located in the directory C:\123R24, the formula returns 'Prepared by KMS Finance C:\123R24\JUNE.WK1'.

To create the footer, select *:Print•Layout•Titles•Footer* and enter **\A1**.

Do you have a question about Lotus products or a favorite technique for using them? Send your letters, including your address and daytime telephone number, to Q&A/Good Ideas, PC World Lotus Edition, *77 Franklin St. #300, Boston, MA 02110. We pay $60 for each letter we publish. Sorry, we cannot acknowledge unpublished materials.*

This material was prepared by Cynthia Fitzgerald and Carol White, with the help of the Lotus Development Corporation customer support staff.

Models on Disk includes the models, macros, or formulas contained in this article. See page L10 for details. This material is also available on CompuServe and from PC World Online.

Corrections and Clarifications

► In March's "Speed Setup Tasks With SmartFill for DOS": On page 106-L15, the formula you're instructed to enter in cell B66 is incorrect. The correct formula is **@IF(@LENGTH(sf2ndcell)=1#AND#sf2ndcell>="A"#AND#sf2ndcell<="Z",@CODE(@UPPER(sf2ndcell))-@CODE(@UPPER(sfstart)),1)**.

► In March's "Plan for a Successful Retirement": In the Formulas section of the setup box located on page 106-L24, the first copy instruction is incorrect. The copy instruction should be "Copy range C13..J13 to cell C14."

► In March's "Browse Your Clip Art Collection": In Figure 1 on page 106-L28, the entry in cell K60 should be **:PLTCFF|**.

The Labels section of the setup box on page 106-L30 contains an incorrect figure reference. Range B8..C12 appears in Figures 2 and 3 only, and does not appear in Figure 1.

► In March's *Q&A* column: In the item "Look Up Exact Value" on page 106-L39, the formula you enter in cell B8 and copy to range B9..B10 should be **@VLOOKUP(A8,A1..C5,2)/(@VLOOKUP(A8,A1..C5,0)=A8)**.

► In April's "Optimize Your 3-D Worksheet for Easy Data Entry": In Figure 4 on page 98-L20, the labels in range H25..H27 should contain underscores instead of slashes. Replace the labels 'dept/sheet', 'date/column', and 'acct/row' with **dept_sheet**, **date_column**, and **acct_row**. Then use the Range•Name•Labels•Right command to assign the new labels in range H25..H27 as names for the adjacent cells in column I.

In the Formulas section of the setup box on page 98-L21, the formula you enter into cell C:D13 and copy to range C:E13..C:G13 should be **@SUM(A:D7..B:D11)**.

In Figure 5 on page 98-L22, delete the quotation marks that appear in the labels in cell I35 and range I37..I39. Add the following labels and then assign the name **address3** to cell I54.

CELL	LABEL
H54	address3
I53	'/Ccellcontents~
I55	{GOTO}temp~
I56	'/RNDtemp~
I57	{WINDOWSON}
I58	{BRANCH \a}

In the instructions to add a new department on page 98-L23 in the second column of text, after you insert another sheet after sheet B, copy range B:A1..B:G13 to cell C:A1.

PC World Lotus Edition regrets the errors.

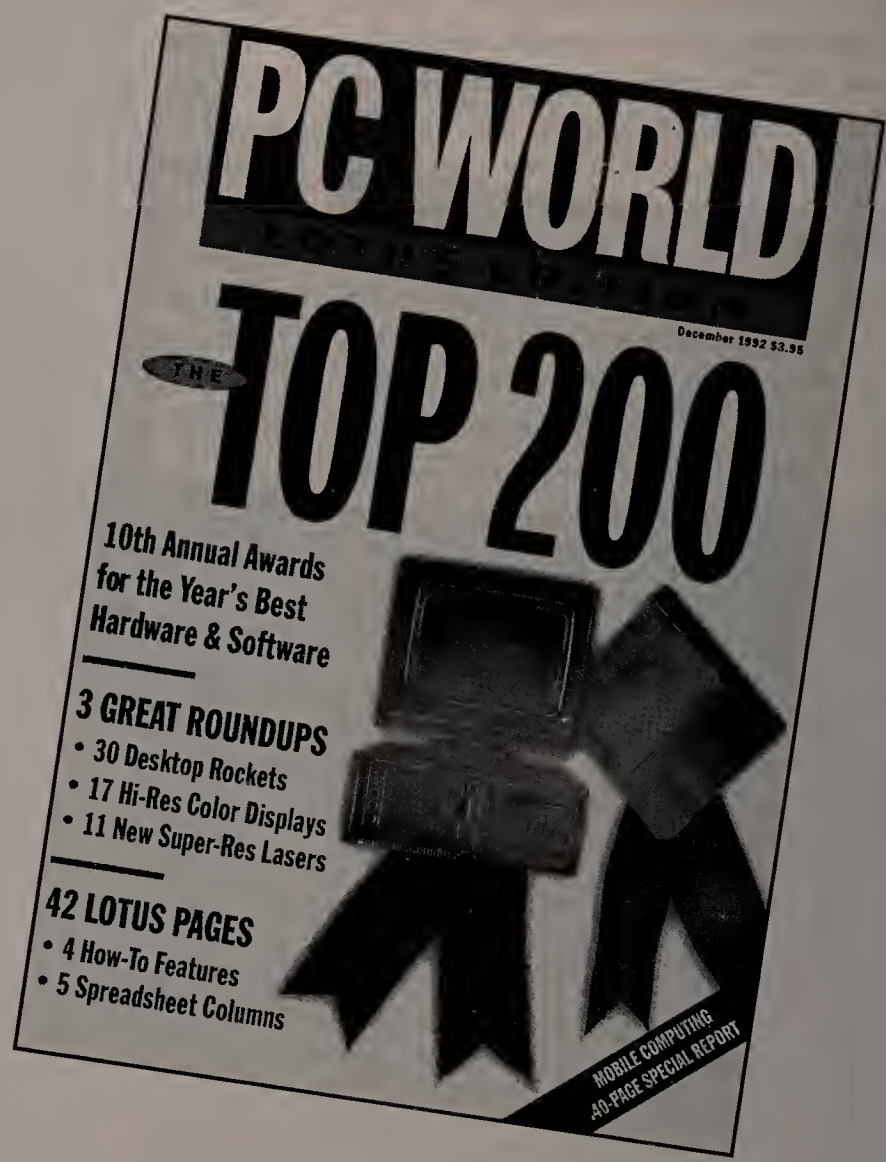
INTRODUCING

PC WORLD'S *LOTUS EDITION*

Get the latest news and comprehensive reviews of PC products plus a large special section devoted solely to Lotus product information. Every month, PC WORLD's Lotus Edition brings you 32+ pages of Lotus spreadsheets, tips, how-tos and more.

PLUS, get all the benefits of PC WORLD! Test drive disks of new software, available only to PC WORLD readers. Performance reviews of products you really use, based on the way you really use them. Consumer alerts on which vendors to trust and which to avoid. Real street prices. Timely buying guides. A new design that makes it easy to find solutions fast. And a whole lot more!

Call in your order today for the special rate of $19.97. You'll receive 12 information-packed issues. That's almost 58% off the newsstand rate. That's just $1.67 an issue!



Please allow 6 to 8 weeks for delivery of your first issue. Basic annual subscription price is $29.90. Savings based on annual newsstand price of $47.40. Offer good only in U. S.

TO SUBSCRIBE, CALL (800) 825-7595 EXT.501

32AC6

PC WORLD
LOTUS EDITION

"Solutions, Solutions."

Enhancements for 1-2-3, Symphony, Quattro Pro and Excel Users

Call **617-449-6222** for a **free** copy of our colorful, 32-page spreadsheet enhancements catalog. All solutions from one convenient source!

Examples . . .

- Spelling Checkers
- Forecasting Tools
- Graphics/Presentations
- Accounting Systems
- File/Password Recovery
- @Functions Libraries
- Fonts and Clip Art
- Financial Applications
- Tax Preparation Forms
- Integration/Consolidation
- Bond and Mortgage Analysis
- Spreadsheet Compilers

INTEX SOLUTIONS, INC.

35 Highland Circle, Needham, MA 02194
617-449-6222 **617-444-2318** (Fax)

READER SERVICE NO. 130

Now, with RoundTrip® you can...

Stop Rekeying

your data into 1-2-3 and Excel

Only RoundTrip puts your data in just the right place in the worksheets you already have. And only RoundTrip automatically builds new worksheets for you... complete with formatting and total and subtotal formulas.

RoundTrip reads your reports, sorts, selects and aggregates your data, and delivers complete, ready-to-use worksheets. It finishes jobs that products like Monarch barely start.

RoundTrip reads highly formatted reports from your mainframe, mini or PC software, xBase files, worksheets or ASCII. It turns all your data into useful management information.

RoundTrip costs $495 (Monarch owners can upgrade for only $129) and is unconditionally guaranteed to save you time and completely eliminate errors in your worksheets.

Call now at **(800) 366-3794** or at **(206) 682-3783**. (Systems 3x and AS/400 users please call **(800) 424-6789**).

"RoundTrip is the most versatile tool of its kind... It may well be indispensable."
—PC Magazine, Feb. 1991

Circle Systems

Circle Systems, Inc.
1001 Fourth Avenue
Suite 3200
Seattle, WA 98154

READER SERVICE NO. 25

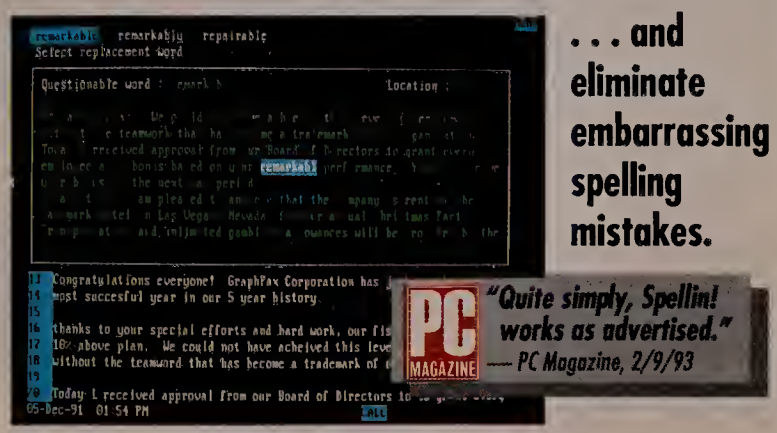
Monarch Is Your Key To Unlocking Vital Corporate Data

Are you buried in printed reports but what you *really need* is a way to bring report data into your spreadsheet or database? Monarch makes it happen. Monarch reads spooled print files, extracts the data, and lets you see it, sift it, select it, and send it out to popular PC applications. Now every mainframe report used in your organization is a source of vital data, with no rekeying!

CALL FOR FREE DEMO
1-800-445-3311

personics
234 Ballardvale St.
Wilmington, MA 01887
508-658-0040 FAX 508-988-0105

Spellcheck 1-2-3 with Spellin!™



. . . and eliminate embarrassing spelling mistakes.

- 90,000 Word Dictionary
- Personal Dictionary
- Automatic Word Replacement
- Capitalization Fixer
- Repeated Word Fixer

Available now for Lotus® 1-2-3® release 2.x or 3.x! (specify)

30-day moneyback guarantee!

Single User: ~~$125~~ **Special $95!**
5-User Pack: $350 Please add $5 for shipping/handling.
M/C, Visa, COD, Check, PO.

INTEX SOLUTIONS, INC.

35 Highland Circle, Needham, MA 02194
617-449-6222 **617-444-2318** (Fax)

READER SERVICE NO. 55

AutoImport 2.1

Pulls Data from Mainframe Reports into PC Spreadsheets and Databases

Easy to use DOS utility that translates into:

- Lotus 1-2-3
- Symphony
- Excel
- Quattro
- dBase
- Clarion
- Delimited & more

- Selectively imports only needed data from any text file
- Can run automatically from a menu or batch file
- Visual point & pick interface - no programming
- Includes a TSR program to redirect printer output to a file
- Reads and correctly translates % signs, dates, commas, negative indicators, international formatting symbols & more

$189 single user, **$420** 5 user LAN
Call for free demo disk or upgrade information.

404-449-1634 FAX 404-449-0052

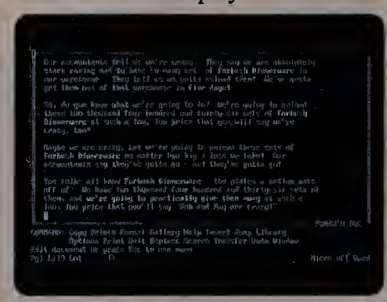
SPALDING SOFTWARE, INC.
154 Technology Parkway, Suite 250
Norcross, GA 30092

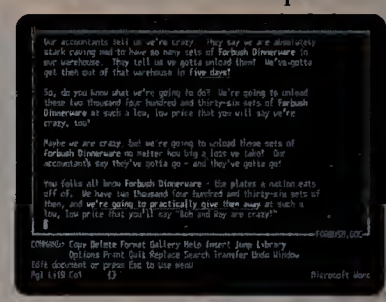
SPALDING SOFTWARE

READER SERVICE NO. 136

Normal Vision
Here's a typical VGA flat-screen. Note dead space at the top and bottom of the display area.

UltraVision™
Here's the same screen with UltraVision. You get bigger and bolder text with no dead space.





Laptop Screen Test.

UltraVision can give your portable PC a great looking screen. Instantly, on-screen text is much easier to read. You can choose from twenty font styles, adjust grey shades, boost screen writing speed, and see 25, 34, 50 or 60 lines on screen in many applications. Works on laptop and notebook PCs with EGA or VGA flat-screens.

CALL FOR FREE DEMO
1-800-445-3311

personics
234 Ballardvale St.
Wilmington, MA 01887
508-658-0040 FAX 508-988-0105

@nalyst™

Financial @Function Add-Ins for Lotus® 1-2-3®, Symphony®, Microsoft® Excel® & Quattro Pro®

PC MAGAZINE EDITORS' CHOICE
April 16, 1991
Financial @nalyst, Version 1.11

"For those of you who have built huge, overly complex spreadsheets to make up for the limitations found in 1-2-3 financial functions, you'll find *Financial @nalyst* a blessing."

— PC Magazine, April 16, 1991

financial @nalyst — Generalized cash flow analysis. Amortization. Date and business day calculations. MORE!

bond @nalyst — Government, agency, corporate & muni bonds, bills & CDs. Price, yield, duration, etc. MORE!

options @nalyst — Black-Scholes & Binomial pricing models with holding cost & dividend adjustments. All "greeks" plus volatility calculations. MORE!

mbs @nalyst — Mortgage-backed securities. Price, yield, duration, factors, implied prepayment. MORE!

Tech Hackers Inc.
50 Broad Street, New York, NY 10004
212-344-9500

READER SERVICE NO. 43

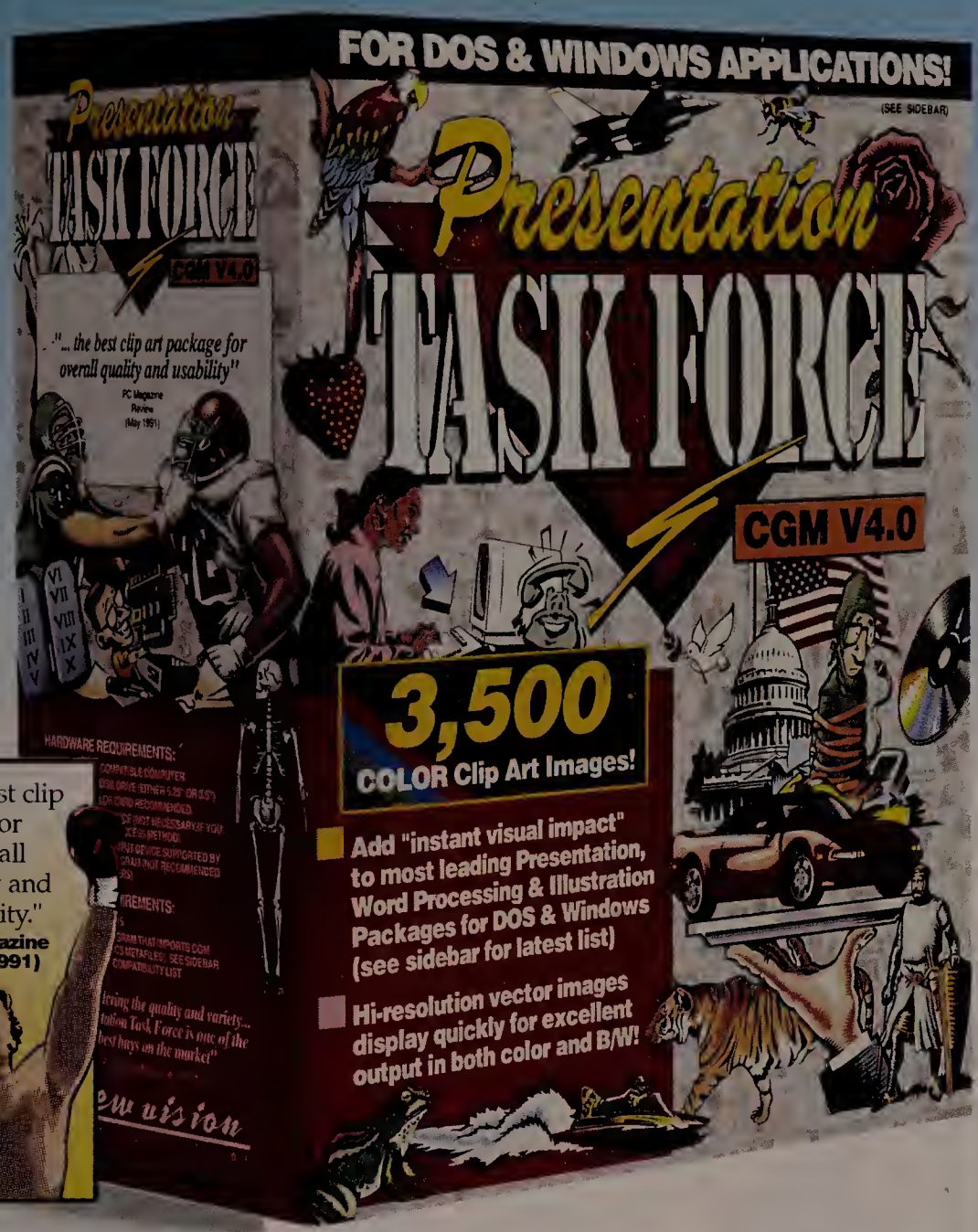
GOT A GREAT BUSINESS IDEA?

Turn it into reality!

Get your high-tech product or service ready and advertise it for less in PC World Lotus Edition's "Product Showcase."

Call PC World at 1-508-820-0440.

Ask for Kevin Normandeau



PRESENTATION TASK FORCE CLIP ART KNOCKS OUT THE COMPETITION!

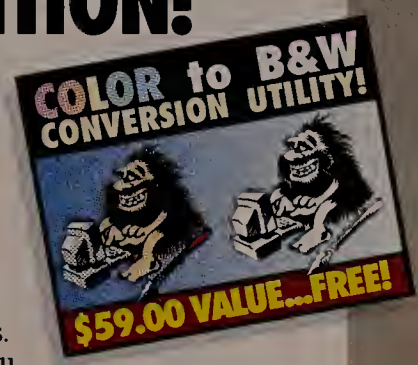
For quality and value, there are NO contenders!

If you're looking for a comprehensive collection of high quality clip art that can be used with over 60 DOS, Windows and OS/2 business applications (see sidebar) ... consider Presentation TASK FORCE 4.0.

PTF 4.0 is the ONLY clip art library to give you **3,500 full-color CGM images** in a MASSIVE, all-in-one collection. At only $199.00, PTF 4.0 is widely recognized as today's best clip art value. Smaller collections, with far fewer images can cost you hundreds (often thousands) of dollars more!

And that's not all! PTF 4.0 includes a **FREE "Color to B&W" Conversion Utility** ($59.00 value) that allows you to optimize PTF color files for dynamite-looking output on b&w printers.

Short on hard disk space? No problem. PTF images are uncompressed, and can be accessed directly from floppy disks. Install the complete collection, or any combination of individual image categories to your hard disk. You decide!



It's unanimous! Presentation Task Force 4.0 delivers a powerful one-two combination of both quality and value, making it the undisputed heavyweight champion of the clip art world.

"Outstanding value & excellent art to boot! ...by far the best value of all the clip art libraries we reviewed."

PC Computing (May 1992)

PRESENTATION TASK FORCE IS A REGISTERED TRADEMARK OF NEW VISION TECHNOLOGIES INC. ALL OTHER PRODUCT NAMES ARE THE PROPERTY OF THEIR RESPECTIVE COPYRIGHT OWNERS. ALL PRICES SHOWN IN US DOLLARS (DEALERS MAY SELL FOR LESS). CANADIAN MSL $229.00. CALL FOR INTERNATIONAL PRICING. NEW VISION TECHNOLOGIES INC., 38 AURIGA DRIVE, UNIT 13, NEPEAN, ONTARIO, CANADA K2E 8A5 TEL (613) 727-8184, FAX (613) 727-8190

Circle 177 on reader service card

Presentation TASK FORCE

WORKS WITH:

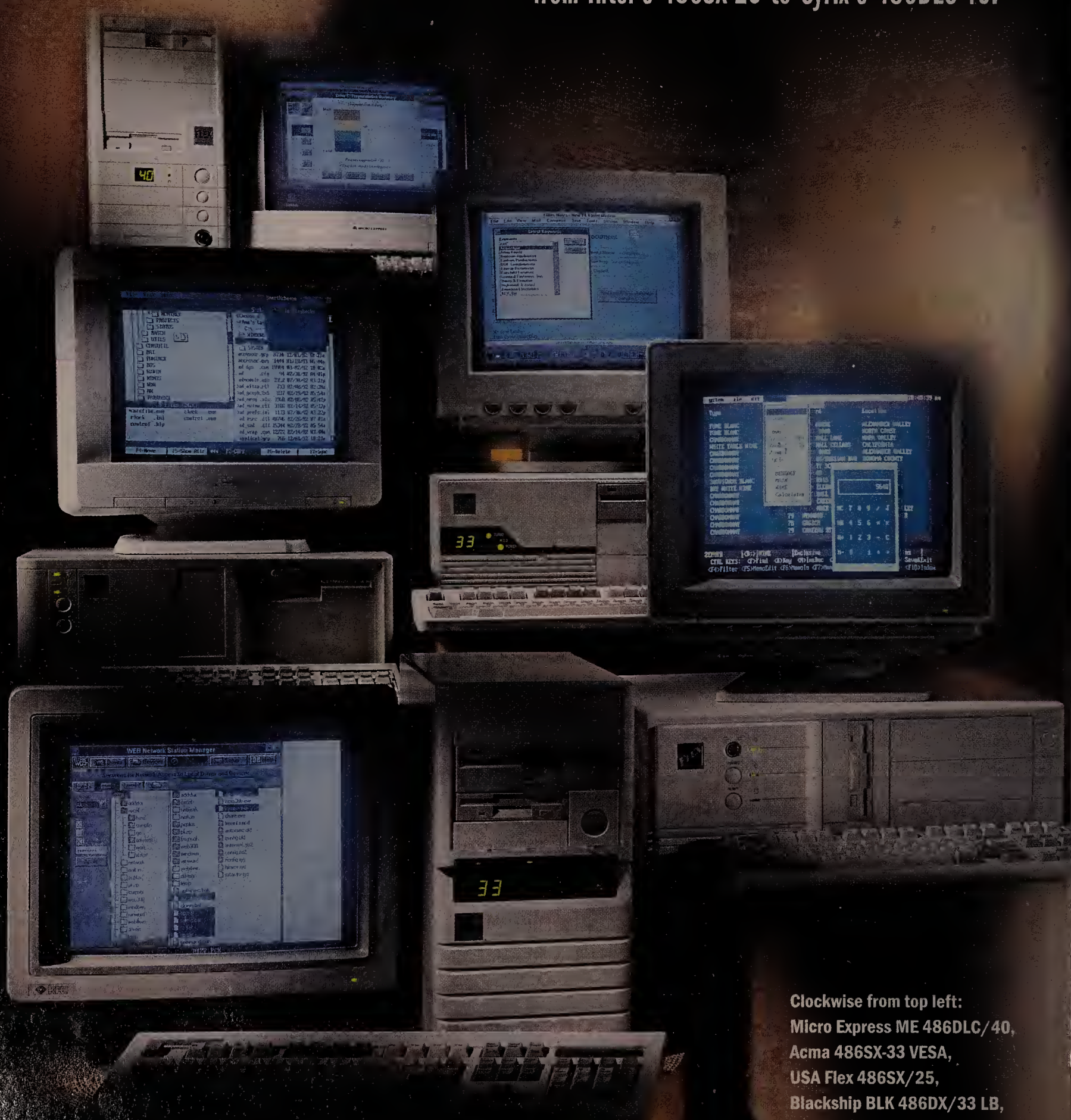
OS/2 APPLICATIONS | MICROSOFT WINDOWS APPLICATIONS | DOS APPLICATIONS

- ALDUS FREEHAND
- AMI PROFESSIONAL
- APPLAUSE II
- CHARISMA
- CORELDRAW!
- DESIGNER
- DRAWPERFECT
- EXPRESS PRESENTER
- EXPRESS PUBLISHER
- FREELANCE GRAPHICS
- FREELANCE GRAPHICS FOR WINDOWS
- HARVARD DRAW
- HARVARD GRAPHICS 3.0
- HARVARD GRAPHICS FOR WINDOWS
- HIJAAK
- HIJAAK FOR WINDOWS
- HOLLYWOOD
- LOTUS 1-2-3
- MICROSOFT EXCEL 4.0
- MICROSOFT PUBLISHER
- MICROSOFT WORD FOR WINDOWS
- MULTIMATE
- PAGEMAKER FOR WINDOWS
- PERSUASION FOR WINDOWS
- POWERPOINT FOR WINDOWS
- PRESENTATION EXPRESS
- PRESENTATION TEAM
- PROFESSIONAL WRITE PLUS
- QUATTRO PRO
- SCRAPBOOK+
- VENTURA PUBLISHER FOR WINDOWS
- WINDOWS DRAW
- WORDPERFECT 5.0, 5.1, 6.0
- WORDPERFECT FOR WINDOWS

PLUS DOZENS MORE!

Available at Software Resellers Everywhere!

Think you can't afford a 486? With prices approaching $1000, you shouldn't consider anything less. We pick the best of 25 price leaders powered by a variety of 486 CPUs, from Intel's 486SX-25 to Cyrix's 486DLC-40.



Clockwise from top left:
Micro Express ME 486DLC/40,
Acma 486SX-33 VESA,
USA Flex 486SX/25,
Blackship BLK 486DX/33 LB,
Diamond DT 486DLC/40

486s for $1250

By Rex Farrance and Melissa R. Riofrio

Setting out to buy a brand-new computer—even a basic business PC—is a bit like shopping for a new car. Just as you can't help dreaming about a Rolls Royce or a Corvette, you *have* to check out those top-of-the-line 486DX2-66s. But your budget can't support the monthly payment—and in your heart, you know you don't need that kind of raw horsepower just to turn out basic reports and spreadsheets.

Does that mean you have to kiss your 486 dreams good-bye? Not on your life. We went on a bargain hunt for complete systems costing $1250 or less, and we were blown away by what we came up with—at last summer's price for a 386SX. Vendors didn't get an easy ride, either: We insisted on 486s only—in a configuration adequate for DOS business use. That adds up to at least 2MB of RAM, one floppy drive, a 60MB hard disk, VGA and a color display, a keyboard, and DOS 5.0 (DOS 6.0 had not been released). Out of 25 vendors submitting PCs that made it

MARC SIMON

into our review, 16 met or beat our price, and only 2 exceeded our mark by more than 10 percent. The least expensive machine of all was the Netis Technology N425VL, which costs just $1025 with 4MB of RAM and an 80MB hard disk.

The Processor Hit Parade

The PCs in this review present a surprisingly diverse array of processors. Most prevalent was the Intel 486SX-25, which powered thirteen of these workhorses. A single lower-speed 486SX-20 entered the race. These 20- and 25-MHz CPUs are common in budget systems; while capable, they're the least powerful of the Intel 486s. Only one 486SX-25 system achieved the combination of value and quality it takes to win a *PC World* Best Buy.

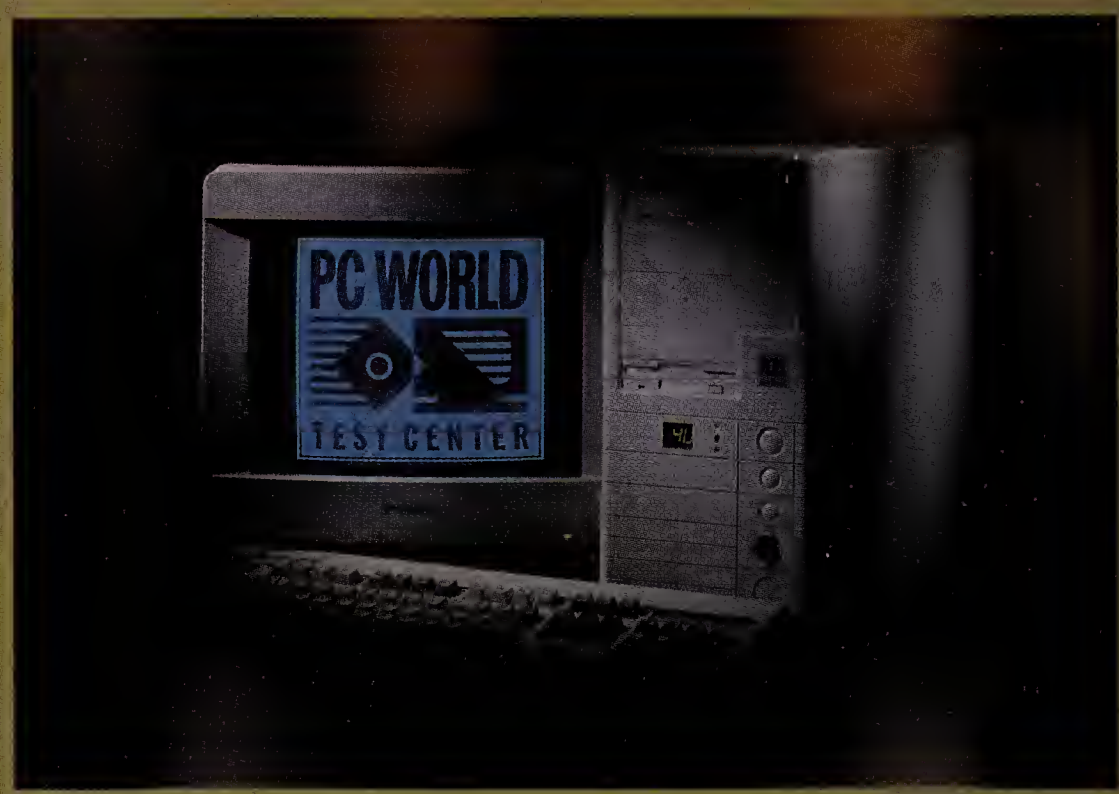
Intel no longer has a monopoly on the 486 market, however. We also tested two PCs using the new Cyrix 486DLC-40. The systems based on this 40-MHz CPU were not only fast—nailing down two of the ten top positions overall—they're also great values. Both PCs bearing these new processors earned Best Buys, and one, the Micro Express ME 486DLC/40, rated as the top overall value.

In addition, we checked out five low-cost PCs using Intel's new 486SX-33. These systems also made a fine showing at the high end of the value curve. And one of the 486SX-33s achieved a Best Buy along with one of three bargain PCs we received based on the reliable and speedy 486DX-33. To round out our group, we had a surprise appearance from one of the most powerful PC processors available—the 50-MHz 486DX beating at the heart of the Auva 486DX/50 Model S10.

Best Buys

Low prices, great performance, excellent support—the five Best Buys in this review prove that these days top value doesn't demand top dollar. While they all came with 4MB of RAM and at least 64K of secondary RAM cache, the variety of processors shows that you can find excellent performance anywhere along the 486 spectrum, whether the processor comes from Intel or Cyrix. The best of the best, the Micro Express ME 486DLC/40, placed among the top five in all categories. Close behind, the Acma scored high in performance, the Blackship in performance and service, and the USA Flex in service. The Diamond DT 486DLC/40 earned its Best Buy with a smooth blend of speed, expandability, and design. The Polywell, the Netis, the Keydata, the ATronics, the Packard Bell, and the CUI systems were nipping at all their heels.

1. **Micro Express ME 486DLC/40** (page 119)
2. **Acma 486SX-33 VESA** (page 105)
3. **Blackship BLK 486DX/33 LB** (page 110)
4. **USA Flex 486SX/25** (page 126)
5. **Diamond DT 486DLC/40** (page 111)



The Best Buy Micro Express ME 486DLC/40 is our overall top value. Both Cyrix 486DLC-40 systems in our review proved to be outstanding values.

Moving in Fast Company

The first step in any *PC World* review is taken in the PC World Test Center, where our technicians put in long hours running systems through the wringer. Test Center director Greg Smith confirmed our own gut instincts—DOS applications would be the sole testing option for this review. Why? Although systems with only 2MB of RAM can run some basic *Windows* applications, they can't complete our *Windows* benchmarks. With that in mind, the test center ran a suite of DOS business application tests using the popular *WordPerfect 5.1*, *1-2-3 3.1*, *Harvard Graphics 3.0*, and *Paradox 3.5*.

It was no surprise that the Auva 486DX/50 Model S10—with its muscular 50-MHz Intel 486DX processor—wound up as the top dog in overall performance. But we weren't expecting the Cyrix-based Micro Express ME 486DLC/40 to power its way into second place—even with the help of its 512K IDE caching hard disk controller. The next five positions were filled by 33-MHz Intel 486s—four SXs and one DX.

The 33-MHz 486DX has earned its reputation as the business standard for desktop PCs, and our tests indicate that the 486SX—substantially identical except for its lack of a math coprocessor—stacks up very well against the DX in handling most business applications. Past looks at systems based on the 33-MHz Cyrix 486DLC revealed performance comparable to the Intel 486SX-25. The 40-MHz Cyrix 486DLC PCs, however, performed on a higher level, taking two of the top ten spots overall. None of the 25-MHz 486SXs managed to break into the top ten.

Upgradability—The Key to a Faster Tomorrow

You buy a 486 primarily to increase your working speed and gain the power to handle more demanding applications. But even if your PC isn't pressed into processor-intensive service right now, it may be in the future. That brings up a second critical reason for choosing a 486: upgradability. The ability to upgrade is particularly important in a system that isn't already near the top of the performance curve—for example, a 486SX-25. Fortunately, all the systems in this review can be upgraded to an Intel OverDrive CPU—the easiest and most cost-effective way to increase your processing speed. Twenty-one machines also have adjustable or upgradable system clocks. This combination of features enables you to reset the system clock on, for example, a 25-MHz 486SX system to 33 MHz and install a powerful 66-MHz OverDrive Chip.

A number of PCs in this roundup have CPUs soldered either directly onto the motherboard or onto a card that plugs into a processor socket. The former have upgrade sockets, and the latter can have their processors removed and replaced. In either case, you can upgrade using an OverDrive CPU, although in the former case you can't remove and reuse the original CPU. The AST Bravo 4/25 provides a unique upgrade to its immovable CPU: You install a card containing a CPU socket and external memory cache in a special connector on the motherboard.

Putting It All Together

Careful attention to configuration and expandability will maximize the use you get out of an affordable PC. For example, memory has a big impact on performance and sets the threshold for *Windows* use. Half a dozen of the computers came equipped with our basic RAM requirement: 2MB, which is adequate for most DOS word processing and light spreadsheet or database work. You need more RAM for running *Windows*, and 18 machines came with the 4MB you need for basic work in that environment. One vendor, Packard Bell, really went whole hog with its PB425/8—loading it up with a *Windows*-optimized 8MB of RAM.

Although all 486s have an internal, performance-boosting memory cache, we were pleased to learn that almost all of these affordable systems came with a secondary memory cache. Only three—the ALR Flyer SD 4/25s Model 80DW, the Quill Qtech PCS-4S25, and the Silicon Valley SVC 486SX/33 35 Pylon II—came unequipped to hold a second-level cache. Almost three-fourths of the other systems provided at least a 64K secondary RAM cache, and the majority of those had either a 128K or 256K cache. Past PC World Test Center benchmarks indicate that a second-level cache gives a system a 7 to 10 percent speed boost in typical business applications. With that in mind, we advise buying a system with at least 64K of secondary memory cache.

Hard disks are one of the most expensive components in any system, and we expected to feel the storage pinch. Surprisingly, however, Polywell was the only vendor that sent us the 60MB hard disk we consider the minimum for practical DOS use. Nineteen other PCs came with 80MB drives—the minimum starter size for *Windows* users. AST, ATS, and Diamond sent computers with a more liberal 120MB of storage. The Gateway 2000 4SX-25 provided a truly generous 170MB drive, and the Packard Bell PB425/8 had an impressive 245MB hard disk. As is common with most current PCs intended for desktop use, all these systems came with IDE drives.

Best Price

The cheapest systems in this review are almost all 486SX-25s. You wouldn't expect to find the fastest or most feature-packed systems here, but smack in the middle of this group sits our premier Best Buy, the Micro Express, which shows that a low price *can* translate to top-notch value.

1. **Netis Technology N425VL** (page 120)
2. **Quill Qtech PCS-4S25** (page 124)
3. **Micro Express ME 486DLC/40** (page 119)
4. **CAF Gold 3D** (page 110)
5. **ALR Flyer SD 4/25s Model 80DW** (page 105)

Best Service and Support

Even at these price levels, compromising on service and support would be penny-wise and pound-foolish. If you want toll-free support and free or low-priced on-site service, look no further. All but a few systems in this review provided adequate support, but among the top five you'll find three Best Buys.

1. **Micro Express ME 486DLC/40** (page 119)
2. **USA Flex 486SX/25** (page 126)
3. **CUI Advantage 486/25SX** (page 110)
4. **Blackship BLK 486DX/33 LB** (page 110)
5. **Dell 425s/L** (page 111)

Best Performance

Auva's 486DX/50 Model S10, the one system that came with a 50-MHz 486DX processor, took the lead in this race. But the real winner here is you. Hot on the heels of the Auva was the Micro Express ME 486DLC/40 that topped our Best Buy list, with two other Best Buys coming up close. Among such company, *fast* and *cheap* are badges of honor.

1. **Auva 486DX/50 Model S10** (page 106)
2. **Micro Express ME 486DLC/40** (page 119)
3. **Acma 486SX-33 VESA** (page 105)
4. **Blackship BLK 486DX/33 LB** (page 110)
5. **ATronics ATI-486SX/33** (page 106)

Affordable Expandability

As with any PC, you need enough expansion slots and drive bays to accommodate present and future peripherals. If you're planning to hook your computer up to a network, you'll probably have server access, and typically you'll be able to get by with a total of three bays—one internal and two externally accessible—and three or four free expansion slots. But for a stand-alone PC, you'll want at least one more bay and one more slot.

Pay careful attention to the number of externally accessible bays. You're likely to need to add a second floppy drive, if your system doesn't already have one, and you'll probably want at least one other accessible bay free to accommodate a tape backup or CD ROM drive. In a pinch, you can always buy external drives—but you'll pay $100 or more extra and sacrifice some desk space. Another way to keep an accessible drive bay free is to use a combination floppy drive, which fits both standard floppy formats into a single half-height 5¼-inch bay. However, none of these bargain-priced systems came with a combo drive.

A Fast Look at Video

Your video subsystem—graphics adapter and monitor—can make or break a system purchase. All the vendors except Netis Technology and Quill Computer Products provided accelerated video. While graphics accelerators are generally desirable and becoming standard, we consider them essential if you're planning to run *Windows*. If you're thinking of doing heavy-duty graphics work, you can improve on a 16-bit accelerator by using a 32-bit local bus accelerator running at system clock speed rather than at the 8-MHz rate of a typical 16-bit expansion slot. Four systems here have local bus video: The Best Buy Acma 486SX-33 VESA, the Gateway 2000 4SX-25, and the Polywell Poly 486-33V, and the Best Buy USA Flex 486SX/25.

In addition, although all the monitors had a 14-inch diagonal, some vendors managed to provide extra quality. For example, the monitor with the Best Buy Acma 486SX-33 VESA supports a non-interlaced display and a 70-Hz vertical refresh rate at top 1024 by 768 resolution. That combination should minimize flicker and be easier on the eyes for most users. In this competitive market, you can get a quality video system with an inexpensive machine.

Keeping Service in the Picture

Service and support issues are crucial, whether you're paying top dollar for your machine or buying a bargain. Warranties on the PCs we're reviewing here vary from a one-year minimum to the fantastic three-year coverage that comes with the Xinetron X/LAN Station 486SX. Since labor is often one of the most expensive components of a repair job, it's worth noting that Polywell will repair its equipment free of labor costs for an amazing five years. Over two-thirds of the vendors provide a year of on-site service for $100 or less, and nine throw it in free with your system purchase.

Most of the time technical problems are minor; that's when you need quick, competent advice—preferably delivered without your having to make a toll call. Auva and Silicon Valley have no central support lines, leaving you dependent on dealers who may be untrained or ill-equipped for tech support. Among the other vendors, ATS, CAF, Netis, Quill, and Tandy make you pay the toll; the rest have toll-free lines. With the current welcome trend toward improved service and support, we're seeing more weekend support, electronic BBS's, and fax lines. We base our evaluations not only on company policies but on calls we make incognito that simulate real technical problems. This time, Micro Express, USA Flex, and CUI formed a tight cluster at the top of our service and support chart.

The Best of the Best

We found so many terrific values, it was hard to stop at only five Best Buys. After sweating out our evaluation, we settled on five excellent systems that meet or better our price point. As a bonus, all give you the RAM and storage you need in a basic *Windows* workstation. The top overall value is the Micro Express ME 486DLC/40. This standout system is built around the new 40-MHz Cyrix DLC chip, and it presented a staggering résumé, nailing down an excellent rating on performance, price, *and* service and support. Its second-place showing in performance was exceeded only by a system using a 50-MHz Intel 486DX. In addition, the ME 486DLC/40's $1150 direct price is one of the best here, and Micro Express had the top rating on service and support.

The Acma 486SX-33 VESA turned in a close second in overall value, earning its Best Buy with a fine blend of hot performance, local bus video, and a terrific monitor. Almost tied with the Acma, the Blackship BLK 486DX/33 LB puts together a winning mixture of speed and service and support to merit its Best Buy.

We found so many terrific values, it was hard to stop at only five Best Buys. After sweating out our evaluation, we settled on five excellent systems that meet or better our price point.

Of the thirteen systems reviewed that were based on the Intel 486SX-25 CPU, only the USA Flex 486SX/25 earned a Best Buy. USA Flex accomplished this by presenting a well-balanced package that included local bus video and a local bus IDE drive connector and one of the highest service and support scores here. Finally, Diamond won its first *PC World* Best Buy with its DT 486DLC/40 system, based on the Cyrix 486DLC-40 CPU. The easily upgradable Diamond system has an even mix of quick performance, good expandability, and sound design. The presence of two out of two 40-MHz Cyrix DLC systems in our winner's circle suggests that value-priced 486DLC-40 systems deserve close consideration.

After getting our hands on 25 inexpensive 486s, one message comes through loud and clear: You don't have to give up processing power, upgradability, or quality to put an ultra-affordable system on your desk. No matter what your application, one of the 486s reviewed here can handle it. After looking at values like these, we can't see why you'd consider anything less.

Rex Farrance is an associate editor and Melissa R. Riofrio is an assistant editor for PC World. *Rex can be reached on PC World Online as REXFARRANC* *(see page 10 for more information).*

For more information about all products in this article, circle reader service no. 902.

Acma 486SX-33 VESA

VITAL STATISTICS

Direct price: $1249
Processor: i486SX-33
PROS: Fast, local bus video, upgradable to 66-MHz OverDrive
CONS: Cramped access to RAM
Contact: Acma Computers, 510/623-1212, 800/786-6888
Reader service no. 670

Acma systems have hit the sweet spot in so many *PC World* reviews—winning Best Buys in October, November, and February—that we were eager to see what kind of PC Acma produces for $1249. The 486SX-33 VESA turned out to be just the kind of value we were hunting for.

Acma paired the hot new Intel 33-MHz 486SX CPU with 128K of secondary memory cache. This combination helped the system nail down third place in overall performance, with a sparkling second-place showing on the *Paradox* test, a strong third-place tie on *WordPerfect*, and a more-than-respectable fifth on *1-2-3* and *Harvard Graphics*. If you don't use a program that is dependent on a coprocessor to crank up its speed, our tests indicate that the 486SX-33's performance is comparable to the 486DX-33's. But if you need more speed and a coprocessor to handle CAD or another application in the future, you can always extract the SX chip and install a hot 66-MHz 486 OverDrive.

The 486SX-33 VESA isn't a stripped system by any means. With 4MB of RAM, an 80MB hard disk, and a Diamond Stealth 24 VLB local bus accelerator card with 1MB of DRAM, the Acma can run *Windows* at a good clip. What's more, you get a Mag LX1460 monitor, which can run 70 Hz noninterlaced at its top 1024 by 768 resolution. That should relieve any worries you might have about eyestrain. When you need room to add peripherals—such as a sound board or a SCSI host adapter—you'll find plenty in the Acma's six free slots, one of which will accept a VESA local bus card. All four drive bays are externally accessible, so you have room to add a second floppy drive and a tape or CD ROM drive.

Acma gives you other nice touches, such as a neat little cover for the reset, power, and turbo buttons, and the key lock—great for warding off accidental resets when you're working at home, especially if you have small children around who are a little too eager to lend a hand. And the company prints safety warnings and a checklist for basic troubleshooting on top of the power supply inside the case. Service and support is solid, too. The Acma comes with a year of free on-site service and toll-free technical support—even on Saturdays. The tech staff proved both responsive and competent.

So what is there not to like? Well, system memory is positioned under the power supply, which makes it a little awkward to upgrade. Balancing this quibble against the PC's many strong points, however, resulted in the second-best overall value in our roundup. In fact, this system is more than just one of the gems in this month's review: For our money, the Best Buy Acma 486SX-33 VESA would stand out on any desktop.

ALR Flyer SD 4/25s Model 80DW

VITAL STATISTICS

Direct price: $1198
Processor: i486SX-25
PROS: Excellent price, service, and support
CONS: Mediocre performance, limited expandability
Contact: ALR, 800/444-4257, 714/581-6770
Reader service no. 671

It surprised us to find an ALR 486 available for less than $1200 direct from the manufacturer—even with just 2MB of RAM installed. Granted, ALR has done plenty recently to lighten up the price side of its price-means-quality design. And to the company's credit, it has maintained the quality and innovative design of its PCs. Furthermore, ALR's service and support standards are excellent, exceeding those of most vendors. For example, the Flyer SD 4/25s Model 80DW we reviewed here is backed with toll-free technical support 11 hours a day, with Saturday support as well. Responsiveness is terrific, and advice is helpful and accurate. Fax support? BBS support? ALR covers all the bases and tops it off with an on-site service policy covering the first year for a nominal $9.95.

This Flyer model is a low-profile unit designed for use on a LAN or where expandability isn't vital. There are only three drive bays, with two already filled. The system also has just three free expansion slots. In addition, ALR managed to fit a proprietary 16-bit slot—designed to fit ALR's fax-modem, SCSI host adapter, or ethernet adapter—into an unused corner of the baby motherboard.

This PC isn't a top performer: The 25-MHz Intel 486SX has limitations, and there's no secondary RAM cache to help out. The Flyer managed lower midrange performance overall, although it fell to last on the *1-2-3* benchmark and next to last on *Paradox*. This PC is worth considering if you need a LAN station and want to buy from a name vendor with a fine track record. If you need speed and expandability, however, you can find a better fit elsewhere.

AST Bravo 4/25s

VITAL STATISTICS

Street price: $1450
Processor: Intel 486SX-25
PROS: 120MB hard disk
CONS: Priced over $1250
Contact: AST Research, 800/876-4278, 714/727-4141
Reader service no. 672

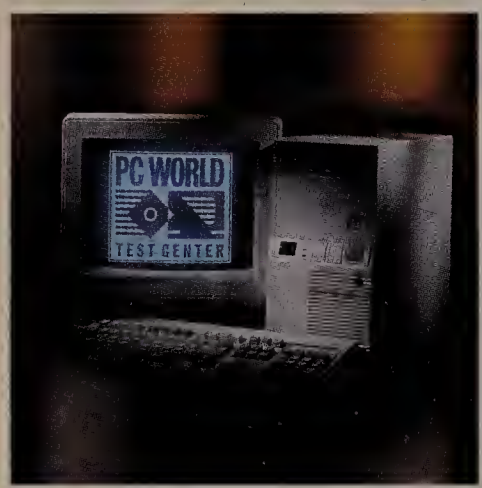
AST is well known as a manufacturer of fast, high-quality systems. In February, the 66-MHz Bravo 4/66D won a Best Buy partly by beating all comers on performance. The AST Bravo 4/25s in this

review is also reasonably quick, especially considering that it's a 25-MHz 486SX. While the system's performance was midrange overall, it outran all but one of its twelve 486SX-25 classmates. Storage and memory are quite generous for an entry-level box, too, with 4MB of RAM and a 120MB hard drive.

The 25-MHz 486SX CPU is soldered onto the motherboard. To upgrade your CPU you purchase a secondary RAM cache module, which contains a CPU socket. Whereas the AST we reviewed in February was one of the most reasonably priced 486DX2-66s we've run into, this $1450 system has the second-heftiest price in our roundup. AST does throw in *Windows* and a mouse, however, and an expensive monitor that supports a noninterlaced display at 1024 by 768 resolution.

Our system had two free externally accessible bays and four free slots. Service and support is excellent, with a year of free on-site service, toll-free technical support, a BBS, and fax support. Although the AST Bravo 4/25s seems pricey for a 486SX-25, if you want a fine *Windows* system, the great video setup and top service make AST's entry worth considering.

ATronics ATI-486SX/33



VITAL STATISTICS

Direct price: $1295
Processor: i486SX-33
PROS: Fast, expandable
CONS: Priced over $1250, CPU hard to access
Contact: ATronics Int'l, 800/488-7776, 510/656-8400
Reader service no. 673

ATronics has impressed us time and again with its capability to address specific product needs. In January, the company sent us one of the best $2500 *Windows* PCs we've ever seen—assembling a Best Buy array of powerful, well-considered components—and hitting our price point right on the nose. In this review, the ATronics overshot our target price by $45 but also delivered more than our minimum configuration. The 4MB of RAM and 80MB hard disk, for example, make the difference between being able to run *Windows* or not, and the powerful 33-MHz 486SX processor and generous 256K of external RAM cache ensured that the ATI-486SX/33 would not get mired on the bottom of the performance chart. In fact, this system ranked number five in overall performance and sped past all but two other machines on the *Harvard Graphics* and disk-intensive *Paradox* benchmarks.

The ATronics unit is a short minitower model with a single floppy drive and room left for three more externally accessible drives. You also have plenty of space for installing peripherals in the six free expansion slots. Upgrading this system wouldn't be entirely painless, however; you'd have to pull the 3½-inch drive cage to extract the CPU. That quibble aside, this motherboard gives you the option of installing a new 50-MHz clock and putting in a 486DX-50, or you can take the more logical path of retaining the 33-MHz oscillator and installing a 66-MHz OverDrive.

The ATronics service and support picture looks good too, with toll-free support and a responsive technical staff who answered every query perfectly. A first-year on-site policy costs $99. The only support drawbacks are the lack of BBS and weekend support. The ATI-486SX/33 came with the performance, RAM, and storage it took to break into a jam-packed top ten of overall values.

ATS 486-33

VITAL STATISTICS

Direct price: $1300
Processor: 486DX-33
PROS: 120MB hard disk, four-year labor warranty
CONS: No toll-free tech support, priced over $1250
Contact: ATS Computers, 619/279-1305
Reader service no. 674

The ATS entry in our affordable 486 sweepstakes is a roomy half-size tower unit. Even with the single 5¼-inch floppy drive and 120MB hard drive installed, there's room aplenty for two internal and four externally accessible drives. A half-dozen free 8/16-bit slots should meet any desktop user's needs.

This PC doesn't lack power: It combines an Intel 486DX-33 with a 256K secondary memory cache to crank out very good overall performance. If you need more speed in the future, you can upgrade to a hot-running 66-MHz OverDrive upgrade.

The 14-inch Shamrock monitor makes a fine team with the Diamond Speedstar graphics accelerator with 1MB of DRAM. ATS also gives you some service extras, such as a four-year labor warranty to complement the one-year parts warranty. The tech support staff was responsive and accurate. But on-site service is a pricey 10 percent of system cost—or $130 for this $1300 PC. And you have to pay the toll on ATS's central support line. This is a good system, all the same—so good that if the company had toll-free support and less-expensive on-site service, it would have rated a Best Buy.

Auva 486DX/50 Model S10

VITAL STATISTICS

Street price: $1299
Processor: 486DX-50
PROS: Fastest system in roundup
CONS: Priced over $1250, no central support
Contact: Auva, 714/562-6988
Reader service no. 675

We're not surprised to see a 50-MHz processor in a server or a CAD workstation, but we were blown away to find one inside a $1299 PC submitted as an affordable 486. The Auva

Does Your Keyboard Speak...

...Windows™?

The Key Tronic TRAK101™ keyboard offers all the features of an enhanced 101-key layout with the added power of an integrated trackball that's customizable for ease of use and enhanced productivity. The TRAK101 is *the* keyboard for Windows.

...Word Processing?

The KB101 PLUS™ keyboard from Key Tronic offers all the features of an enhanced 101-key layout with the added benefits of larger backspace and return keys. The KB101 PLUS features high performance capacitance switch technology, double-shot molded keycaps and a durable enclosure.

...Macros?

The FLASH101™ keyboard from Key Tronic offers unique styling, all of the features of an enhanced 101-key layout, plus the added power of on-screen programmability. The FLASH101 lets you quickly preview function keys, macros and other programmed keystrokes right on your CRT.

...Spreadsheets?

The ABACUS™ on-line keypad from Key Tronic offers a uniquely functional and dramatically styled keypad that has been designed with calculator functions, F-key references (Mac version only), page control functions (PC version only) and a *Send Key*™ that pastes calculations directly into your text or spreadsheet.

When It Comes To Applications, Key Tronic Speaks Your Language.

To find out more about the Key Tronic family of products, just call 1-800-262-6006 in the U.S. or 1-800-348-6006 in Canada for the name of the dealer nearest you.

800-262-6006

Key Tronic®
MADE IN THE U.S.A.

©1993 Key Tronic Corporation. Key Tronic is a registered trademark of Key Tronic Corporation. The Key Tronic logo, TRAK101, KB101 PLUS, FLASH101 and ABACUS are trademarks of Key Tronic Corporation. All other names are registered trademarks (®) or trademarks (™) of their respective companies.

Circle 116 on reader service card

TO DESIGN OUR NEW MOUSE, WE STARTED BY READING PALMS.

In relentless detail, we studied hands of all dimensions.

We consulted professors of kinesiology, engineers, ergonomists and computer users. We used digital fiber optics to analyze the human hand. We followed it in motion.

The result is a new Microsoft® Mouse that is, well, anatomically correct. Uncommonly comfortable.

The palm is perfectly supported. Left or right handed, the grip is comfortable. Fingertips fall naturally into place. A click feels just right.

This mouse even looks good. Intriguingly asymmetrical. Yet it somehow reminds you of the gentle curves of a human form.

Did we mention that it also has some innovative new software features? They allow you to customize the mouse, so it works the way you like to work.

Try the new Microsoft Mouse. If you're not comfortable, we'll refund your money. Guaranteed. Details are on the box, which you can quickly get your hands on at a computer store near you.

Microsoft
Making it easier

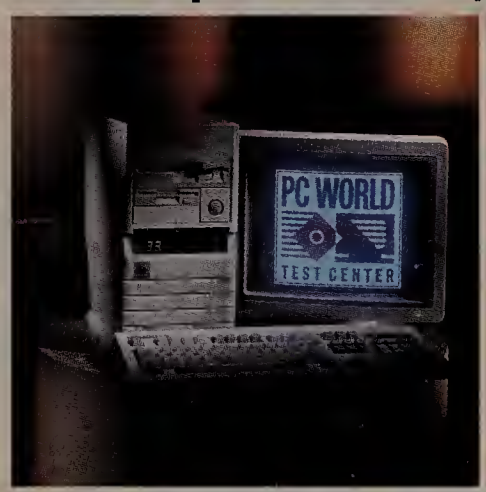
© 1993 Microsoft Corporation. All rights reserved. Printed in the USA. Microsoft is a registered trademark of Microsoft Corporation.

486DX/50 Model S10 features a full 50-MHz Intel 486DX CPU, a 256K secondary memory cache, and 4MB of RAM. Riding the wings of this powerful combination, the Auva soared to number one in overall performance, first on the *1-2-3* and *Paradox* benchmarks, and second on *WordPerfect* and *Harvard Graphics*.

The story doesn't end with speed. There's good expandability in the compact case, even with two floppy drives and a hard disk installed. You can add two more externally accessible drives, and Auva got five free slots onto the tiny motherboard.

Unfortunately, Auva provides no central support for purchasers, nor does it require dealer support training. That means if you buy this PC, you must make sure your dealer is competent and will remain available to give reliable technical support. There is a support line for dealers, but the lack of end-user support is hard to swallow. Auva won't sell you an on-site service policy either. Otherwise, this is a very good PC. But in our opinion, unless your confidence in your dealer is unbounded, you shouldn't consider a product with this level of support.

Blackship BLK 486DX/33 LB



VITAL STATISTICS

Direct price: $1250
Processor: 486DX-33
PROS: Fast, both floppy drives, excellent service
CONS: None
Contact: Blackship Computer Systems, 800/531-7447, 408/432-7500
Reader service no. 676

Blackship always seems to deliver real value to budget-conscious buyers, and the BLK 486DX/33 LB is no exception. This PC offered so much more than we were asking for, we *had* to give it a Best Buy. A 486DX-33 processor in a $1250 unit is always a great deal and virtually guarantees good performance in this price class.

With 4MB of RAM and a 64K secondary RAM cache, this unit came in fourth on overall performance and a sterling second on the *1-2-3* benchmark. These results reinforce our contention that the first 64K of external RAM cache gives the biggest payoff. If you think you'll want a larger cache, however, ask Blackship to install it before you complete your purchase. That way you won't have to remove the drive cage to do your own upgrade.

You'll be pleased to learn that this handsome little minitower comes with both floppy drives and an 80MB hard disk. And you have room for two more externally accessible drives plus six free 8/16-bit slots (including two VESA local bus slots). The versatile motherboard supports speeds from 20 MHz to 50 MHz, opening an array of upgrade possibilities. The most logical choice for a future speed boost would be to swap in a 66-MHz OverDrive CPU.

Buying a PC without solid service and support is like forgetting to buckle up for a long road trip. With Blackship, the belt is securely fastened. The toll-free tech support lines are staffed by courteous, competent, and responsive technicians. And the support BBS and fax service is handy, too. To top it off, a year of free on-site service comes with your PC, and the company's two-day turnaround service policy is just fine. All this in a computer that costs $1250 direct from the vendor spells Best Buy in our book.

CAF Gold 3D

VITAL STATISTICS

Street price: $1195
Processor: i486SX-25
PROS: Excellent price, expandable, good accessibility
CONS: No toll-free support, mediocre performance
Contact: CAF Technology, 818/369-3690
Reader service no. 677

The CAF Gold 3D is a good-looking Intel 486SX-25 system with a terrific $1195 street price. Its roomy desktop case gives you plenty of space for drives and peripherals, with five drive bays paired with five free slots (four 8/16 bit and one 8 bit). Accessibility is near perfect. The motherboard supports a clock swap to 33 MHz, and the CPU socket accepts up to a 66-MHz OverDrive.

Buyers of this system may want to take advantage of that upgrade path: Even with 64K of secondary RAM cache installed, the CAF runs about 14 percent slower than the 486SX-25 class leader overall. The system came with our minimum 2MB of RAM, and unfortunately, CAF filled up all eight RAM sockets with 256K SIMMs. So if you want to install more memory, you'll have to pull at least some of the old RAM, and you'll have to buy extra RAM to replace it.

It appears CAF cut some corners on its graphics accelerator, as the Trident 9000 unit has a minimal 256K of video RAM. The service mix has its lumps as well: The lack of both toll-free central tech support and an on-site service option stuck in our throats. Great price, expandability, and accessibility make this system a pretty fair value. But the top competitors have better support and give you a lot more bang for your buck.

CUI Advantage 486/25SX

VITAL STATISTICS

Street price: $1207
Processor: i486SX-25
PROS: Excellent service, expandable
CONS: Mediocre performance
Contact: CUI, 800/458-6686, 408/241-9170
Reader service no. 678

A computer doesn't get too far in *PC World* without solid service backing, and CUI knows how to support its products. Our research tells us that tech support responsiveness and

accuracy are at the top of your list, so we pay attention to time spent on the phone and the answers we get. We got through immediately on CUI's toll-free lines, and the technicians steered us right in every case. CUI charges a reasonable 5 percent of system cost for a year of on-site service, or $60.35 on the Advantage 486/25SX. If a repair requires a trip to the service center, the company will turn it around in a single day. That kind of care adds up to one of the highest service and support scores here—not bad for a system with a street price of just $1207.

Unfortunately, this PC is pretty slow, even for a 486SX-25. That was a bit surprising, considering that it has a 256K secondary RAM cache. The Advantage 486/25SX wound up second slowest overall and dead last on the *Harvard Graphics* test. This poor performance hurt the Advantage, dropping it way down in the rankings.

This PC has some intriguing design points. The plastic flat-pack processor is soldered to a circuit board that plugs into the CPU socket. That way, you can still upgrade by extracting the CPU assembly and installing a new processor. The motherboard supports replaceable clocks up to 33 MHz, so you can use an OverDrive as fast as 66 MHz. Expandability is good for a compact box, with six free slots (four 8/16 bit and two 8 bit) and three free drive bays, all of which will accept a removable-media drive.

Accessibility to the motherboard is good, except it's a little hard to get to the memory. If we rated on service alone, the CUI Advantage 486/25SX would have our ringing endorsement, but we think you're better off buying a faster PC.

Dell 425s/L

VITAL STATISTICS

Direct price: $1299
Processor: i486SX-25
PROS: Excellent service and support, OverDrive for DX2 upgrade
CONS: Priced over $1250
Contact: Dell, 800/289-3355, 512/338-4400
Reader service no. 679

Many buyers won't buy anything *but* a Dell computer. For them, Dell is an island of stability in an unfriendly sea that's swallowing small and large vendors alike. They don't want to hear about this vendor's speed or that vendor's bargain prices. As far as these folks are concerned, they're not just buying a PC, they're buying the backing of the company that sells it.

Dell sent us its new 425s/L model, with an Intel 486SX-25 CPU, 4MB of RAM, and an 80MB hard disk. This PC might do best hooked up to a LAN, as it has just three 8/16-bit slots for expansion. You can add 128K of secondary memory cache, although none was installed in our test system. You wouldn't know from its performance, however, as the Dell displayed better-than-average speed for a 486SX-25 and a respectable midpack overall showing.

This model has an easy-open case and an innovative modular design. The case bottom and removable peripherals cage is of a light, tough plastic. And the single floppy drive fits in an adapter that snaps in and out of one of two externally accessible bays. Dell was thinking of your future when it put this box together. You can extract the SX CPU and add a 50-MHz OverDrive, or you can move the jumpers and put in a 486DX-33 or even a 66-MHz OverDrive. And to make sure this PC grows with you into the next generation, Dell provided the 238-pin socket for the Pentium-based OverDrive for DX2.

One reason Dell has retained such brand-loyalty is its terrific support, with toll-free lines that have recently gone to 24-hour-a-day, year-round service. Fax, BBS, a year of free on-site service—what more could you ask? This is one of the most upgradable PCs here, although it isn't the fastest. But its buyers won't mind. It's a Dell.

Diamond DT 486DLC/40

VITAL STATISTICS

Direct price: $1225
Processor: Cyrix 486DLC-40
PROS: Easy to upgrade, 120MB hard drive, good performance
CONS: None
Contact: Diamond Technologies, 800/989-7253, 714/252-1008
Reader service no. 680

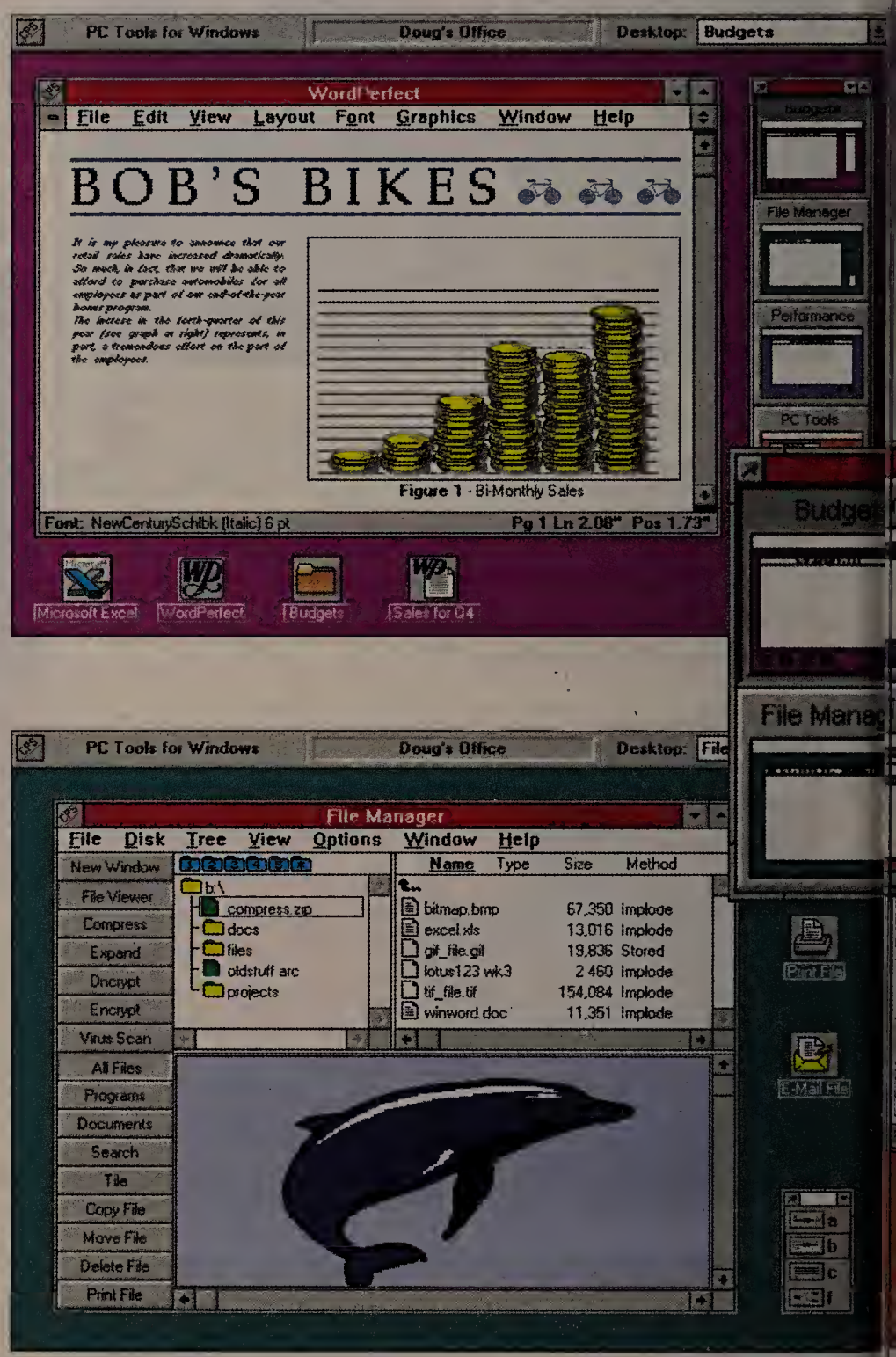
After reading this review, you may conclude that Cyrix 486DLC-40 really spells Best Buy, because both systems in the review that use this hot new 40-MHz CPU earned top honors. Both the Diamond DT 486DLC/40 system and the Micro Express ME 486DLC/40 are winners here. You can't draw grand conclusions from such a limited sample, but the results do suggest that the 486DLC-40 offers remarkable value in affordable systems.

The Diamond Technologies system achieves a splendid overall balance. It's fast, making our top ten and even beating out one 486SX-33. And if your application can use a 387 (which is inside every Intel 486 but not in the 486DLC), you'll welcome the Diamond's installed Cyrix FastMath coprocessor. Further adding to the speed, Diamond provided a 256K secondary RAM cache. You get 4MB of RAM and a 120MB hard disk—not bad for a $1225 economy box. The video system is solid too, and the Western Digital graphics accelerator is loaded up with 1MB of RAM. Diamond sweetened the pot with a free mouse.

If you need a future speed boost, you can replace the system clock and pop an Intel OverDrive CPU into the upgrade socket. There's room to move under the hood, with good access to everything. Six free 8/16-bit slots is generous in a compact box, and all three of the available drive bays are externally accessible.

Diamond's service policies look good too, starting with the 15 months' parts and 24 months' labor warranties. Add on a toll-free tech line, great responsiveness, and solid accuracy; stir in a year of on-site service for $75 and a two-day turnaround service policy; and you have a solid protection recipe. A quibble? No fax or BBS support and no support on weekends. So what do you get when you cross a hot new processor with a well-designed, well-supported, upgradable PC? A Best Buy, of course.

Introducing PC To
Just think of it

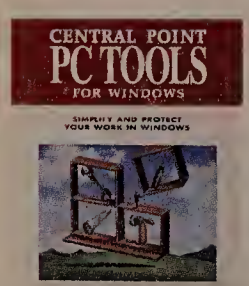


[1]
Organize and simplify your work.

Our unique MultiDesk desktop manager lets you put related applications, folders and files into their own separate desktops. Set up as many desktops as you like, then switch between them instantly. It all adds up to a less cluttered, more productive Windows environment that works like you do.

[2]
Improve the speed and efficiency of common tasks.

Our integrated File Manager has advanced drag-and-drop capabilities that let you quickly locate, view, copy and print files. With over 75 viewers, you can scan files (including compressed PKZIP data) without having to open their applications first. Hate to turn off your PC because you don't want to set everything up again? Our DeskSaver feature solves that problem too.



Windows® is a great product. And someday, it'll be even better. But why wait?

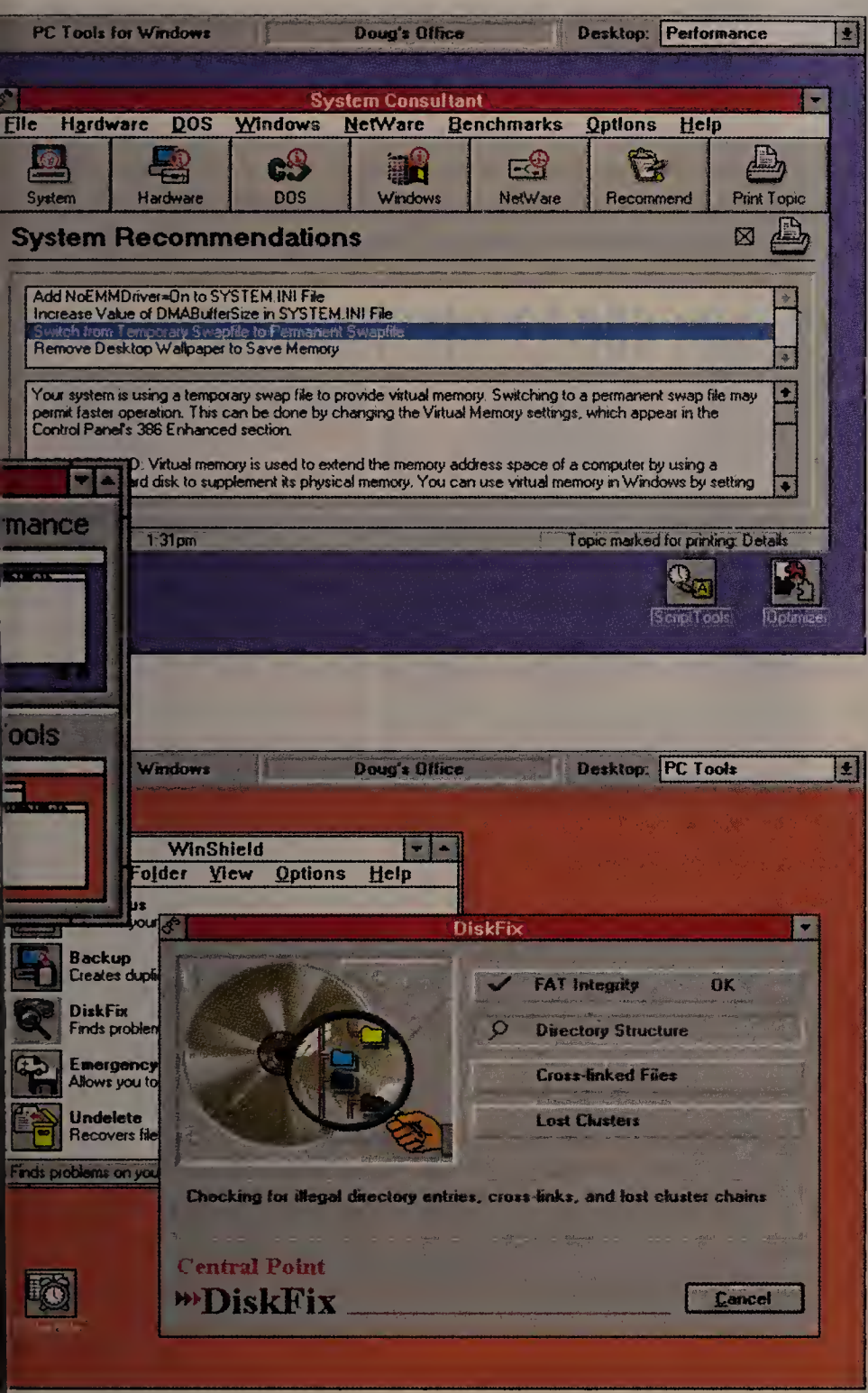
New PC Tools™ for Windows® is here right now. It saves you time, reduces clutter and gives you easy access to all the functions and files you use most often. In fact, PC Tools for Windows is so innovative that after reviewing it, the editors of PC/Computing asked, "Who needs Macs?"

For starters, there's our unique MultiDesk™ desktop. MultiDesk is an intuitive desktop manager that lets you organize your work by creating as many desktops as you need for your projects, tasks, or clients. So, if you spend the day switching between many different projects, you won't lose anything in the clutter.

Ever misplaced a file or couldn't remember its

*Our lawyers said we could run this headline if we make the following absolutely clear: Windows is a trademark of Microsoft Corporation. PC Tools for Windows is the sole product of Central Point Software, Inc. Microsoft is
Central Point,® PC Tools,* MultiDesk,* WinShield,* Speed Keys,* System Consultant* and DiskFix* are trademarks of Central Point Softwa

ols™ for Windows.®
as Windows 4.0.*



[3]
Enhance your system's performance.

System Consultant™ performs over 400 system checks and provides recommendations for improving your PC's performance. Our Disk Optimizer can automatically defragment your hard disk at prescheduled intervals, or on command.

[4]
Automatically protect your data.

We've included new Windows versions of Backup, Undelete, Anti-Virus and DiskFix.® They're all integrated in WinShield,™ an automatic data-protection system that results in worry-free computing. Our Emergency Disk builds a bootable recovery disk to help get a crashed system up and running fast.

name? Our File Manager lets you quickly view files without having to load the program first. Tired of cryptic, abbreviated file names? Now you can attach long file names to your data to keep things clear and simple.

We also created Speed Keys™ so you can take shortcuts through Windows, and System Consultant that gives you specific tips for improving system performance.

PC Tools for Windows is at your nearest dealer.

For more information, a free demo disk, or to upgrade from PC Tools for DOS, call us at **1-800-759-1805**. Your purchase is backed by our 60-day guarantee.

Find out for yourself why the editors are already heralding PC Tools for Windows as "The ultimate desktop." It may just be the best thing since, well...Windows.

Central Point Software INC.®

Point Software did not collaborate on this product, and this ad is not in any way sponsored by Microsoft. PC Tools for Windows does not replace Microsoft Windows or any future version thereof; it simply complements it. f other products mentioned herein are used for identification purposes only and may be trademarks of their respective companies.

Circle 52 on reader service card

First Computer FCS 486SX-33

VITAL STATISTICS

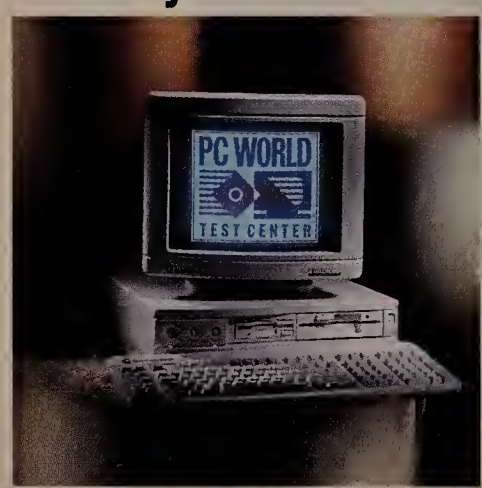
Direct price: $1199
Processor: i486SX-33
PROS: Very good price, dust-protected keyboard
CONS: Sub-par performance for a 486SX-33, no on-site service
Contact: First Computer, 800/325-1911, 404/441-1911
Reader service no. 681

The First Computer FCS 486SX-33 comes with a 33-MHz Intel 486SX teamed with a 128K secondary RAM cache—a combo suggestive of both hot performance and a price higher than $1199. Unfortunately, the FCS 486SX-33's speed didn't live up to expectations. Its overall rating was almost 17 percent slower than the next slowest 33-MHz PC and was surpassed by almost half the 25-MHz 486SXs. That's not what we expect from a 33-MHz machine.

Service and support is very good in most respects: The toll-free support is responsive, and we got flawless advice. Unfortunately, there's no on-site service option with this model.

The FCS 486SX-33 came with just 2MB of RAM. The flat performance is frustrating, because this PC has a lot to recommend it. The full desktop case provides ample expandability in six free slots and three free externally accessible bays. The vendor even threw in a keyboard with a flip-up dust protector. In fact, we fell in love at first sight with this low-cost 33-MHz machine. But its 25-MHz 486SX-class performance did much to cool our ardor.

Gateway 2000 4SX-25



VITAL STATISTICS

Direct price: $1495
Processor: i486SX-25
PROS: Great software bundle, 170MB hard disk
CONS: Priced over $1250, poor response, no free drive bays
Contact: Gateway 2000, 800/846-2000
Reader service no. 682

For many, Gateway 2000's name is synonymous with value. Users have purchased Gateway systems in droves, taking advantage of ultra-competitive prices, outstanding design, and super service—including long hours of toll-free support and a year of free on-site service. Ironically, Gateway's fantastic success has thrown a stumbling block in its path. Gateway customers have struggled of late to get through on the company's toll-free service lines. In our own support checks, we found the lines busy more often than not. This poor responsiveness hurt Gateway's usually outstanding service rating.

The handsome, low-profile $1495 Gateway 2000 4SX-25 didn't make our price point. But the system comes with 4MB of RAM, a 170MB hard disk, Microsoft *Windows* and *Works for Windows*, antivirus, disk optimization, and data recovery tools from Central Point's *PC Tools 8.0* and Diagsoft's *QA Plus*. Oh yeah—you also get both standard floppy drives, a mouse, and integrated local bus video with 1MB of DRAM.

There's room for a lot of cards in the five free expansion slots, but all the drive bays are already filled—a problem if you want to add an internal CD ROM or tape drive. Despite its high price compared to the other systems, this PC offers a lot of extras for users who won't need to add more internal drives. Gateway is on a crash program to increase its support staff and phone lines. We're hoping we can report soon that the company has returned to the form that won it our Service Excellence award. [*Editor's note: At press time, Gateway told us it no longer offers this PC with a 486SX-25 CPU. The new model is identical in price and features and uses an i486SX-33.*]

Insight 486-33 MHz ValueLine

VITAL STATISTICS

Direct price: $1249
Processor: i486DX-33
PROS: Fast performance on *1-2-3*
CONS: No on-site service option, limited video resolution
Contact: Insight Computers, 800/927-7848, 602/350-1176
Reader service no. 683

Insight's 33-MHz Intel 486DX offering clearly isn't lacking in power—not when it can virtually match the performance of the second-fastest PC in this roundup on the processor-intensive *1-2-3* benchmark and is just 25 percent overall behind the scorching 50-MHz Auva system. The 486DX CPU gives you the advantage of a built-in math coprocessor, and the Aten motherboard comes with 64K of secondary RAM cache installed (expandable to 256K). In addition, Insight provides 4MB of RAM and still manages to squeeze in at a dollar under our $1250 price point.

All the drive bays in the Insight's case are accessible. With three of those bays free and six free expansion slots, you shouldn't ever find yourself hurting for peripheral or drive capacity. The company bundles a mouse and *Dr. Solomon's Anti-Virus* and throws in *Stacker 2.0* in case you want to use its real-time compression to double your native 80MB hard drive capacity. The video subsystem isn't anything special, however. The graphics accelerator has just 256K of DRAM installed, and the Premier Innovations 41 monitor won't support anything beyond standard 640 by 480 VGA resolution.

Service and support is mostly a positive story. While responsiveness was a little spotty, our questions were answered accurately. Furthermore, the support lines are toll-free and available on weekends. And just before press time, Insight told us it was extending its support hours around the clock. Unfortunately, there's no on-site service option, although the company insists that it does everything it can to mitigate the lack of on-site service by pouring resources into its existing service channels. On balance, this is a pretty solid value-priced computer—especially considering the bundled extras.

IBM

"As the next wave of technology rolls in, we'll help you ride it."

IBM PCs and IBM people help make it easier to choose a computer for today — and tomorrow.

In fact, tomorrow is just around the corner. It's the brave new world of processing called Pentium™.[1]

These newest IBM PS/ValuePoint™ PCs are upgradable to an Intel® OverDrive™ processor that will be based on Pentium[1] technology. So when you're ready to take this big next step, these PCs — along with the personal computing experts at IBM PC Direct™ — will help you take it in stride.

PS/ValuePoint systems are available in more than 20,000 configurations: as stand-alones, servers or medialess clients. Call us and we can customize one for you using many of today's most popular options.

Also new and standard: faster local bus video, larger and faster hard drives, upgradable memory to 64MB and easier processor upgradability.

intel inside

Angelica Horaitis
Director of Value Brands
IBM Personal Computer Company-NA

PS/ValuePoint 425SX/S

$1,579* NEW!

IBM Credit Lease $57/mo.**

4MB RAM, IBM DOS and Microsoft® Windows™ preinstalled

Fast!

i486™SX/25MHz processor
8KB internal cache
High Performance SVGA VESA Local Bus Video with 1MB DRAM

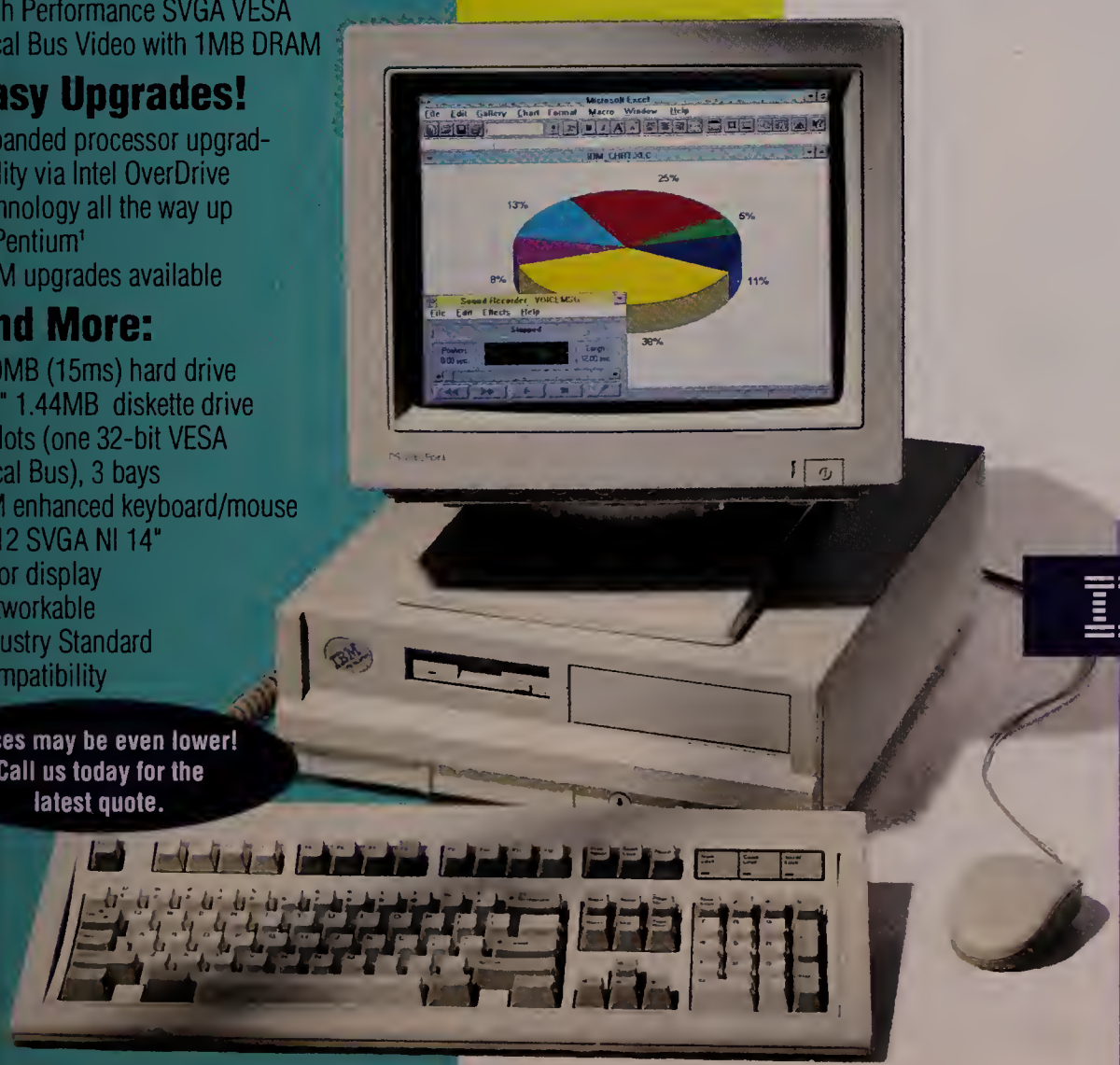
Easy Upgrades!

Expanded processor upgradability via Intel OverDrive technology all the way up to Pentium[1]
RAM upgrades available

And More:

120MB (15ms) hard drive
3.5" 1.44MB diskette drive
3 slots (one 32-bit VESA Local Bus), 3 bays
IBM enhanced keyboard/mouse
6312 SVGA NI 14" color display
Networkable
Industry Standard Compatibility

Prices may be even lower! Call us today for the latest quote.



IBM PC Direct

We're putting the personal in personal computing.

Call 1 800 IBM-2YOU

1 800 426-2968, refer to: X613PCW1
8am-midnight M-F, EDT; 8am-7pm Sat., EDT.

MasterCard VISA DISCOVER

Purchase order is available for qualifying customers.

IBM

FREE **The IBM PC Direct Source Book**

This is it! The 1993 Spring/Summer Source Book for many of the most popular hardware, software and peripheral products for IBM and IBM-compatibles.

Call 1 800 IBM-2YOU now for your free copy.

"One call gets your and your

PS/ValuePoint 466DX2/T

$3,609* **NEW!**

IBM Credit Lease $130/mo.**

4MB RAM, IBM DOS and Microsoft Windows preinstalled

$3,789*

IBM Credit Lease $137/mo.**

8MB RAM, IBM OS/2® preinstalled

Fastest!

- i486 DX2/66MHz processor
- 8KB internal cache
- High Performance SVGA VESA Local Bus Video with 1MB DRAM
- Internal i487™ math coprocessor
- 128KB L2 cache

Easy Upgrades!

- Pentium[1] upgradable via Intel OverDrive technology
- RAM upgrades available

And More...

- 527MB (9ms) hard drive
- 3.5" 1.44MB diskette drive
- 8 slots (one 32-bit VESA Local Bus), 6 bays
- IBM enhanced keyboard/mouse
- 6319 SVGA NI FS 15" color display
- Networkable
- Industry Standard Compatibility

Choose from quality components to have IBM PCs personalized for you.

If the systems on these pages don't meet your exact specifications, we'll customize an IBM PS/ValuePoint for you with your choice of...

- Processors
- Hard Drive
- Floppy Disk
- Memory
- Display
- L2 Cache Memory
- Video DRAM
- IBM OS/2 or IBM DOS and Microsoft Windows

...And more!

Call us today for a quote.

intel inside

We customize! Call us now for a PC with your specs, at your price.

Prices may be even lower! Call us today for the latest quote.

1. All models are upgradable with Intel's future OverDrive processor based on Pentium processor technology. 2. Warranty and 30-day guarantee information available through IBM and IBM Authorized Dealers. Please call 1 800 426-2968 for details regarding IBM's moneyback guarantee and limited warranty. Copies of the terms of IBM's moneyback guarantee and limited warranty are available upo request. 3. At no additional charge during warranty. 4. Available Monday-Friday 8am-5pm in your time zone, when serviced by IBM. parts are required, this service is provided after receipt of parts shipped overnight. APPLIES TO IBM PC DIRECT SALES ONLY.

The "PC" in PC Direct stands for personal computers — and a good deal more.

It stands for Personal Commitment. Any time of the day or night, the IBM Personal Systems HelpCenter™ is always available.

It stands for the Personal Care you can count on from professionals: the IBM Service Representatives.

And it stands for the Personal Confidence that comes from knowing you're getting a quibble-free, 30-day moneyback guarantee plus one of the best warranties in the industry.

All of which is brought to you by the people who design, build, sell and service more PCs than anyone else. So while you compare how much PC you can get for the price, don't forget to factor the people behind the PCs into the equation, too.

Call IBM PC Direct today. Get to know the PC people you've always been looking for. And who'll always be there for you.

The HelpWare™ Advantage: Guarantees and personal service every step of the way.

30-day moneyback guarantee. No qualms, quibbles or questions asked. If you're not happy, neither are we.[2]

Expert help from PC specialists 24 hours a day. Need help deciding, deciphering and demystifying? Call us and we'll help. We're always here. 24 hours a day. You can also contact us by 24-hour bulletin board or automated fax, if you wish.[3]

Free 1-year onsite service. You send nothing to us, we come to you — with genuine IBM Service — no charge.[3]

Fast, genuine IBM Service. If you do need to call us, our own service representatives — not a third-party vendor — will respond. We have over 10,000 service representatives, in more than 1,600 locations nationwide, backed by more than one billion dollars in parts.[4]

IBM Personal Computer Trade-in Program. If you need to replace your current systems give us a call... even if they're not IBM PCs.

IBM Credit Lease. Don't have ready cash to make your purchase? We offer an IBM Credit Lease to qualified commercial customers.

specs, your prices kind of people."

Larry Deaton
PC Director of Direct Response
Marketing and Customer Support
IBM Personal Computer Company-NA

BM ThinkPad™ 700C

$4,229*

3M Credit Lease $153/mo.**

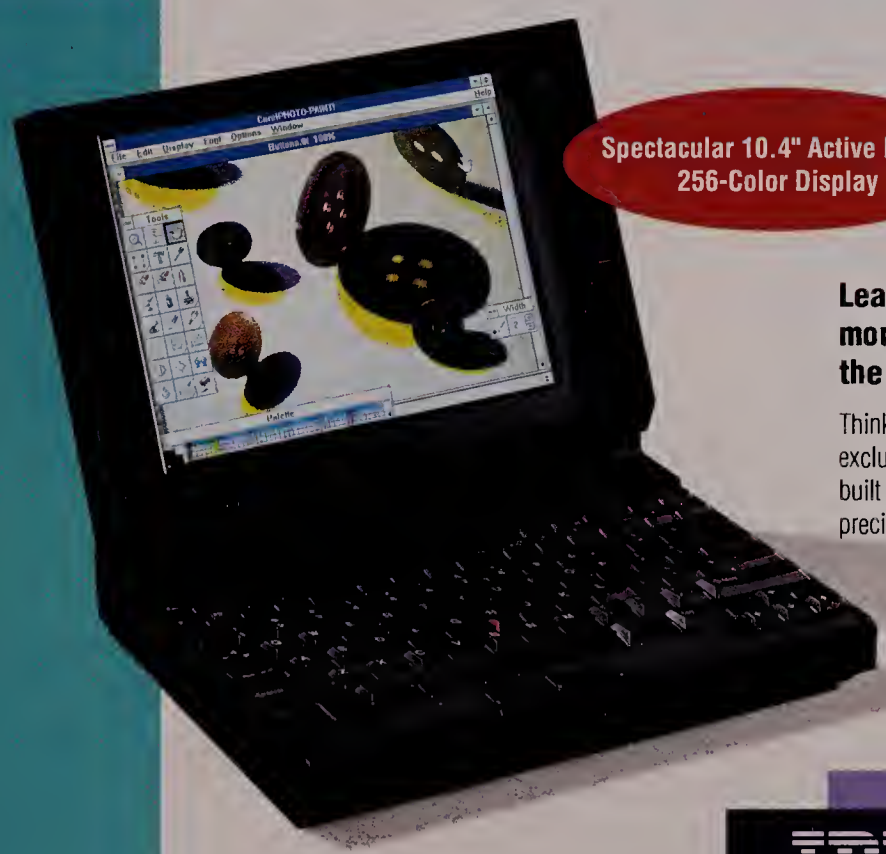
86SLC™/25MHz processor
MB RAM
20MB removable hard drive
.5" 1.44MB diskette drive
6KB internal cache
0.4" active matrix 256-color display
ull-size keyboard with integrated
rackPoint II™ pointing device
dvanced Power Management
M DOS, Microsoft Windows and
rodigy®† preinstalled

BM ThinkPad 700

$2,639*

M Credit Lease $96/mo.**

36SLC/25MHz processor
MB RAM
0MB removable hard drive
5" 1.44MB diskette drive
KB internal cache
ull-size keyboard with integrated
ackPoint II pointing device
5" mono STN LCD display
M DOS and Prodigy† preinstalled



Spectacular 10.4" Active Matrix 256-Color Display

Leave your mouse at the house

ThinkPad 700 series models have the exclusive TrackPoint II cursor control built right into the keyboard. It's smooth, precise and easy to use.

Thinking options? May we suggest...

IBM Port Replicator for 700 and 700C	$75
IBM Expansion Unit (docking station) for 700 and 700C	$859
IBM Expansion Cartridge for 700 and 700C	$425
IBM High Speed Internal Data/Fax Modem (14,400 bps/14,400 bps) for 700 and 700C	$545

IBM PC Direct

We're putting the personal in personal computing.

Call 1 800 IBM-2YOU

1 800 426-2968, refer to: X613PCW1
8am-midnight M-F, EDT; 8am-7pm Sat., EDT.

Purchase order is available for qualifying customers.

IBM®

"They listened, they helped me, and made it easier to get everything I needed."

FREE IBM PC Direct Source Book

You'll find it all and more in the latest edition. From the newest IBM PS/ValuePoint and ThinkPad models, to software, peripherals, printers, networking products, multimedia... anything and everything.

Call 1 800 IBM-2YOU
and we'll send one 2YOU today.

PS/ValuePoint add-ons

PS/ValuePoint displays:		Price
6312 Color Display	6312001	$379
6314 Color Display	6314001	$439
6319 Color Display	6319001	$349
6317 Color Display **NEW**	6317M01	$999
Memory:		
2MB SIMM (70ns)	6450902	$130
4MB SIMM (70ns)	6450128	$265
8MB SIMM (70ns)	6450130	$625
16MB SIMM (70ns)	60G1622	$1,195
1MB DRAM KIT (PS/ValuePoint graphics)	60G1623	$72
Storage:		
IBM 245MB AT® Hard Drive (IDE) **NEW**	32G4194	$539
IBM 340MB AT Hard Drive (IDE) **NEW**	32G4195	$719
IBM 527MB AT Hard Drive (IDE) **NEW**	32G4196	$1,079
IBM 1.0GB SCSI Hard Drive **NEW**	6451052	$2,279
IBM 3.5" Enhanced Rewritable Optical Drive	6451295	$1,499
IBM 16-bit ATFast SCSI Adapter (internal) **NEW**	32G4088	$205
IBM CD ROM II Drive	6451104	$489
IBM 3510 SCSI Enclosure	35100V0	$215
LAN/Communications:		
T/R Adapter 16/4 AT	25F7367	$535
T/R Adapter 16/4 II	03F0215	$610
10 base 2 Ethernet® ISA	60G0615	$140
10 base T Ethernet AT	60G0605	$125
LAN Streamer MCA 32-bit card	92F8942	$860
LAN Adapter/A Ethernet	48G7171	$260
LAN Adapter Ethernet	48G7169	$156

Carla Hendra

Carla Hendra
Customer, IBM PC Direct

We sell personal computing products one person at a time.

What's the one thing you have in common with millions of other computer products buyers?

You're different.

Whether it's hardware, software or peripherals, your needs are almost as unique as your fingerprints. But at IBM PC Direct, the unusual is usual and we pick up the phone ready for anything.

We can sell you just about any add-ons or software you want. In fact, if you don't see an IBM or IBM-compatible product listed in our catalogs—a copy of which is yours for the asking—call us anyway. Chances are we have what you need!

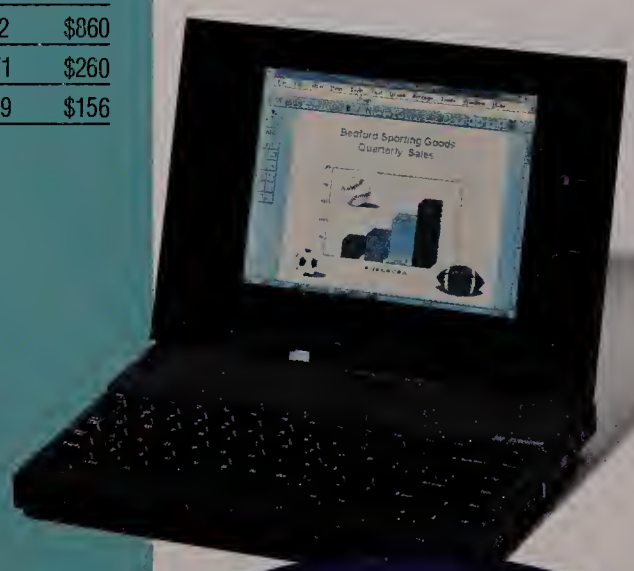
After all, keeping you happy is something we take personally.

IBM ThinkPad 300

$1,699*

IBM Credit Lease $62/mo.**

- 386SL/25MHz processor
- 4MB RAM
- 80MB hard drive
- 9.5" mono STN LCD display
- 3.5" 1.44MB diskette drive
- 64 KB external cache
- 82 keys with embedded numeric keypad
- Power management features
- IBM DOS preinstalled



Prices may be even lower! Call us today for the latest quote.

IBM PC Direct

We're putting the personal in personal computing.

Call
1 800 IBM-2YOU
1 800 426-2968, refer to: X613PCW1
8am-midnight M-F, EDT; 8am-7pm Sat., EDT.

Purchase order is available for qualifying customers.

*IBM prices only. The offerings, prices and products are subject to change or withdrawal without prior notice. Products you acquire may not be counted under any existing Volume Purchase Agreement. The same offerings and products may be available through IBM Authorized Remarketers. Remarketer prices may vary. Shipping and handling charges are extra. **IBM Credit Lease prices quoted are for 36-month terms. Lease rates quoted are good through 6/30/93, after which time rates are subject to change without notice. Lease available to qualified commercial customers only. †PRODIGY will not run without a modem. A modem is not included with the ThinkPad 700C or 700. A customer who acquires a ThinkPad 700 or 700C and a modem may contact PRODIGY to obtain a One-Month Free Trial Membership. ThinkPad 700C, 700 and 300 systems and options are manufactured in Japan. PS/ValuePoint 6312, 6314 and 6319 Color Displays are manufactured in Korea. The PS/ValuePoint 6317 Color Display is manufactured in Taiwan. IBM, OS/2 and AT are registered trademarks of International Business Machines Corporation. PS/ValuePoint, SLC, ThinkPad, TrackPoint II, HelpWare and HelpCenter are trademarks of International Business Machines Corporation. PC Direct is a trademark of Ziff Communications Company and is used by IBM under license. Intel and the "Intel Inside" logo are registered trademarks of Intel Corporation. Pentium, OverDrive, i486 and i487 are trademarks of Intel Corporation. Ethernet is a registered trademark of Xerox Corporation. PRODIGY is a registered servicemark and trademark of Prodigy Services Company. Microsoft is a registered trademark and Windows is a trademark of Microsoft Corporation. ©1993 International Business Machines Corporation.

Keydata 486SX/25 Keystation

VITAL STATISTICS

Direct price: $1245
Processor: i486SX-25
PROS: Good service and support
CONS: Limited expandability
Contact: Keydata, 800/486-4800, 908/755-0350
Reader service no. 684

We'll say right up front that the Keydata 486SX/25 Keystation is a really good value, with all the desktop essentials. You get 4MB of RAM, a 256K secondary RAM cache, and both standard floppy drives. In addition, the company combined a Cirrus Logic graphics accelerator with 512K of DRAM and a noninterlaced Korea Data Systems monitor to produce a top-notch video subsystem.

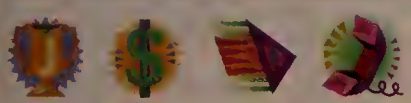
The 486SX/25 Keystation has plenty of peripheral potential in five free expansion slots. There's only one free drive bay, but it's externally accessible. In terms of performance, the Keystation beat all the other 486SX-25 systems on the *Harvard Graphics* and *Paradox* tests—and on *Harvard Graphics* it even outdistanced three 33-MHz systems. The 25-MHz Intel 486SX CPU is hard-wired—but onto a circuit board that plugs into the CPU socket. This approach allows the company to minimize costs and still leaves you with an upgrade path. If you replace the 25-MHz oscillator with a clock that ticks at 33 MHz, you can upgrade all the way to a 66-MHz OverDrive.

Keydata's service and support prescription should make it easy to maintain a healthy PC. It starts with an 18-month parts and labor warranty and a year of free on-site service. On top of that, the toll-free tech line connects to responsive technical support reps. Keydata doesn't have a BBS but will fax you support documentation. If you're looking for a fast 486SX-25 system with a fine video setup, this Keystation could be just what the doctor ordered.

Micro Express ME 486DLC/40

VITAL STATISTICS

Direct price: $1150
Processor: Cyrix 486DLC-40
PROS: Great price, service, and performance
CONS: None
Contact: Micro Express, 800/989-9900, 714/852-1400
Reader service no. 685



Say something good about this machine. Go ahead. And while you're at it, heap on a bunch of superlatives—chances are you'll be right on the mark! Overall, this is the best low-cost PC we've ever reviewed—bar none. Let's start with the fiery new 40-MHz Cyrix 486DLC processor, designed for use in affordable PCs like this one. Cyrix seems to have hit a home run with this CPU—it delivers just the right combination of speed and economy to score big at this price point. Speaking of economy, Micro Express has really managed to deliver the goods. Is a $1150 direct price with 4MB of RAM, 128K of secondary RAM cache, and a 512K caching IDE disk controller affordable enough for you? The half-size tower design leaves a generous four drive positions free, three of which are externally accessible. And if you like to add in peripherals, this system's five free slots will oblige.

Micro Express recognized that even buyers of an inexpensive Cyrix-based PC would want to keep the path open to Intel's attractive OverDrive upgrade. So the motherboard has a replaceable system clock and an upgrade socket that will accept Intel OverDrive CPUs. This PC is so fast, however, that you'll probably love it just the way it is. It took a 50-MHz Intel 486DX to unseat the ME 486DLC/40 from first place in overall performance. But the Micro Express nailed top position on the *WordPerfect* and *Harvard Graphics* tests and came in fourth on *Paradox*. The caching controller gave the ME 486DLC/40 an extra edge in our performance suite, as we test without disk caching software installed. Loading a software cache with some of the other fast systems would make the Micro Express machine's performance seem somewhat less transcendental, but any way you slice it, this is a hot PC.

We've saved the best course for last: Micro Express service earned the top rating in the review. How? Well, try making a toll-free support call at midnight on Christmas Eve if you want to find out. Does that mean 24-hour, year-round tech support? You bet. And you won't give up responsiveness or accuracy. You get a two-year parts and labor warranty, and a year of on-site service costs a reasonable $50. Two-day turnaround and fax support more than make up for the lack of a BBS. That brings us right back where we started: This Best Buy PC is an easy winner in every category.

MIS 425SX

VITAL STATISTICS

Direct price: $1279
Processor: i486SX-25
PROS: Fine service and support
CONS: Poor graphics resolution
Contact: MicroNiche Information Systems, 800/733-9188, 408/730-9188
Reader service no. 686

We love it when products cluster near the top of a category in our reviews because it means you have an abundance of value to choose from. That's how this month's service section looks: The top seven positions are packed as tightly as a bunch of bananas, and MIS is right in the group. They all have a one-day-turnaround service policy, and our probe of toll-free central support yielded immediate response and accurate answers. If you want on-site service, it will cost you a mere $45 for the first year, and fax support is free. The

only demerits come from the lack of weekend and BBS support.

The system's average performance is exactly what you'd expect from a 25-MHz 486SX—adequate for a starter PC. The MIS 425SX's hardwired 25-MHz Intel 486SX CPU is soldered in place, a move that cuts costs. To make sure you're not facing premature obsolescence, the motherboard also has an upgrade socket. Drop in an OverDrive CPU, and you're cranking along at a clock-doubled 50 MHz. MIS installed no secondary RAM cache, but the system has the capacity for 256K, and the slot for the cache card makes the cache upgrade one of the easiest in this review.

You can access everything you need to inside the case very easily. There's plenty of room for peripherals in six slots, and each of the three free drive bays can hold a removable-media drive. MIS supplied a vanilla video setup, however: There's only 256K of DRAM on the Cirrus Logic accelerator, and the ViewSonic 1 monitor is capable of only standard 640 by 480 VGA display. To its credit, the monitor supports noninterlaced output at that resolution. There's nothing about the MIS system that will boost it to stardom, but it is a solid value. And its vendor's service policies make the company worthy of your attention.

Netis N425VL

VITAL STATISTICS

Direct price: $1025
Processor: i486SX-25
PROS: Best price in roundup, two free local bus slots
CONS: No toll-free technical support
Contact: Netis Technology, 408/263-0368
Reader service no. 687

The Netis N425VL is a system that will grab the bargain hunter's attention. Where else can you find an Intel 486SX-25 with 4MB of RAM, a 64K secondary RAM cache, and an 80MB hard disk for $1025? If that sounds good, you also get a motherboard with two local bus slots.

As with the Key Data system in this review, the CPU is soldered onto a module that plugs into the CPU socket. You get two free VESA local bus slots, although Netis supplied a 16-bit Acumos SVGA card. In addition, the motherboard provides four free 8/16-bit slots and two free 8-bit slots. All three free drive bays support drives you can access from the outside of the case.

When it comes to getting around inside the desktop case, your access to the CPU is slightly pinched, and the secondary memory cache is placed beneath the drive cage. Even though the internal appearance is cluttered, however, you can reach the memory fairly easily. The service and support scores were good overall, with a two-day turnaround policy and BBS, fax, and Saturday support. Calls were answered right away and accurately. You have to pay the toll on your support calls, however—pretty tough if you're calling this Sunnyvale, California, vendor from New York. And the on-site service is $100 for a year. But with a buy-in as low as $1025, this PC still shines as a good value and a bargain hunter's dream.

Packard Bell PB425/8

VITAL STATISTICS

Street price: $1299
Processor: i486SX-25
PROS: 8MB of RAM, 245MB hard disk, free software
CONS: Poor support responsiveness, priced over $1250
Contact: Packard Bell, 818/886-9998
Reader service no. 688

The Packard Bell PB425/8 is a one-stop shop for the entry-level buyer. It's loaded up with *Windows*, Packard Bell's version of *1-2-3 for Windows*, and *Lotus Write for Windows*. The system is *Windows*-optimized with 8MB of RAM, two floppy drives, and a huge, 245MB hard disk. You even get an internal modem with this PC—that's pretty impressive, considering it missed our price point by less than $50.

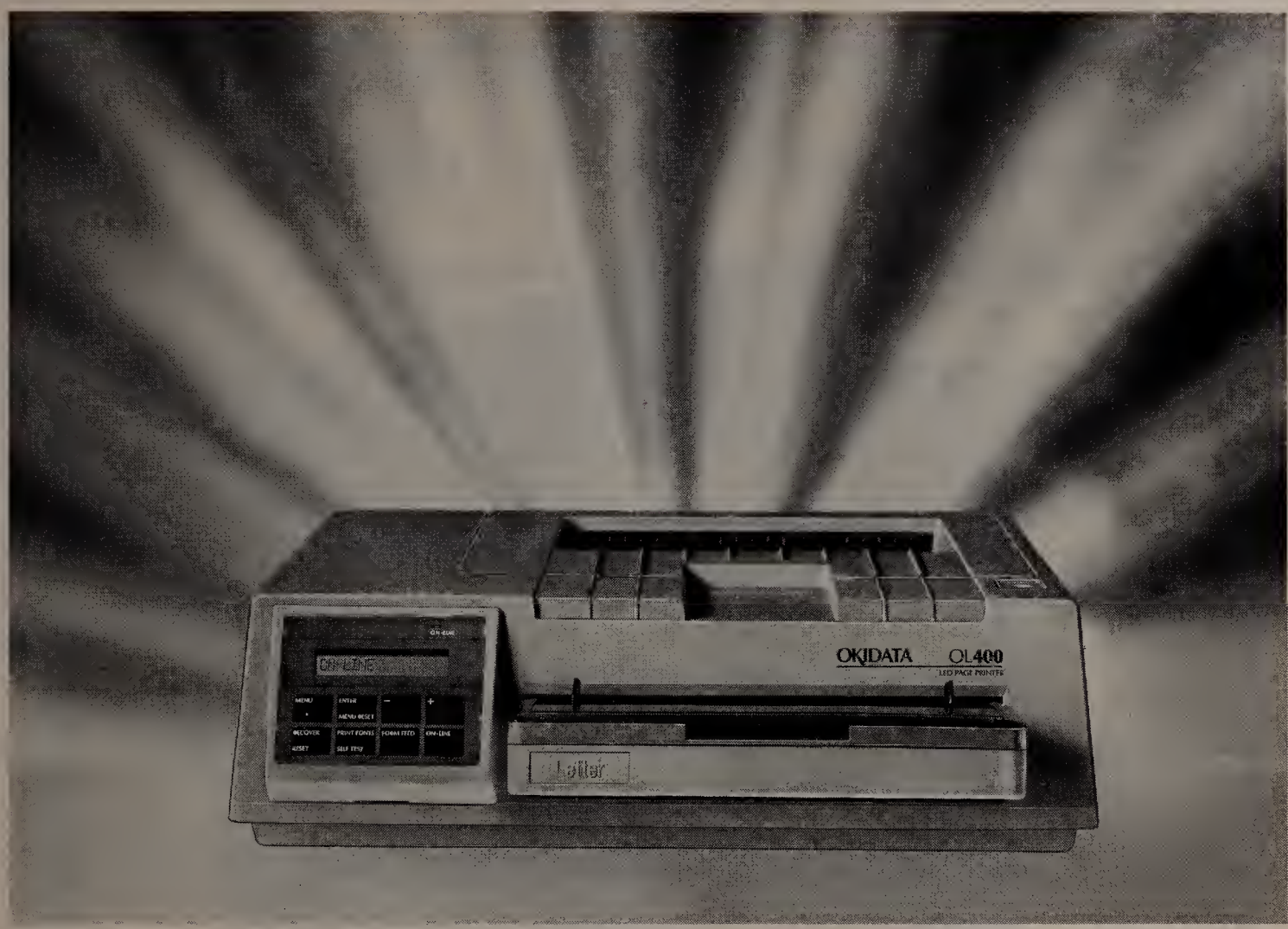
Performance is good for a 25-MHz 486SX, helped by a 128K secondary RAM cache to a finish near the median overall. And the PB425/8 managed to tie two 33-MHz PCs for third place on the *WordPerfect* test. The one free drive bay is externally accessible, and all four expansion slots are free.

The one place where Packard Bell stumbled is service and support. You wouldn't know it by the policies: Calls are toll-free and available 24 hours a day, seven days a week. Packard Bell provides fax and BBS support, and you don't pay a dime for a year of on-site service. There's a support line for dealers, although you're not likely to get support from many of the discount outlets selling Packard Bells. Our main problem was getting through when we called. We dealt with one unanswered call and two recordings asking us to call back between 10 p.m. and 5 a.m. In addition, some of the advice we got didn't solve our problems. The poor responsiveness and accuracy dragged down service scores that would have otherwise been good, and the overall rating of the machine suffered. That's too bad, because this system offers an extremely attractive bundle of extras that represents a hidden savings of hundreds of dollars.

Affordable 486 Prices Stabilize

This is the eleventh time we've run a system review that includes late list price information we researched just before going to press. Last summer and fall, prices plunged so radically it was hard to tally the changes. Now, however, costs seem to have leveled—at least for the moment. In fact, these affordable 486s had the smallest two-month price movement we've seen in the last year. The Blackship BLK 486DX/33 LB's direct price dropped $55 to $1195, making this Best Buy an even better value. And the least expensive 486 in our review—the Netis Technology N425VL—dipped $50, breaking the $1000 barrier at $975. Finally, Quill Computer Products trimmed $50 off the price of its Qtech PCS-4S25, which you can now buy for $1049.

WHY OKIDATA RE-INVENTED THE LASER PRINTER.



THE OKIDATA® OL400

Conventional laser printers rely on a multi-part system of moving laser beams, rotating mirrors and focusing lenses to create each page of output. Sound complicated? It is. That's why Okidata engineers replaced it with a solid-state LED printhead producing 2,560 precise points of light.

Okidata's no-moving-parts printhead comes with a 5-year warranty – the industry's longest. But it's only one reason to choose the Okidata OL400 4 ppm printer for professional-quality output in any home or small business application.

The OL400 also comes with 17 resident fonts, full compatibility with all major software, and a 200-sheet paper tray. You can add extra fonts, extra memory, even specialty paper trays.

Most important, the OL400 offers the legendary Okidata reliability that makes it one of today's best entry-level printer values. All of which means buying your first page printer doesn't have to be complicated. Not since Okidata made it simple.

OKIDATA®
a Division of Oki America, Inc.

CALL 1-800-OKI-TEAM EXT. 203 FOR THE DEALER NEAREST YOU.

OKIDATA is a registered trademark of Oki Electric Industry Co., Ltd.

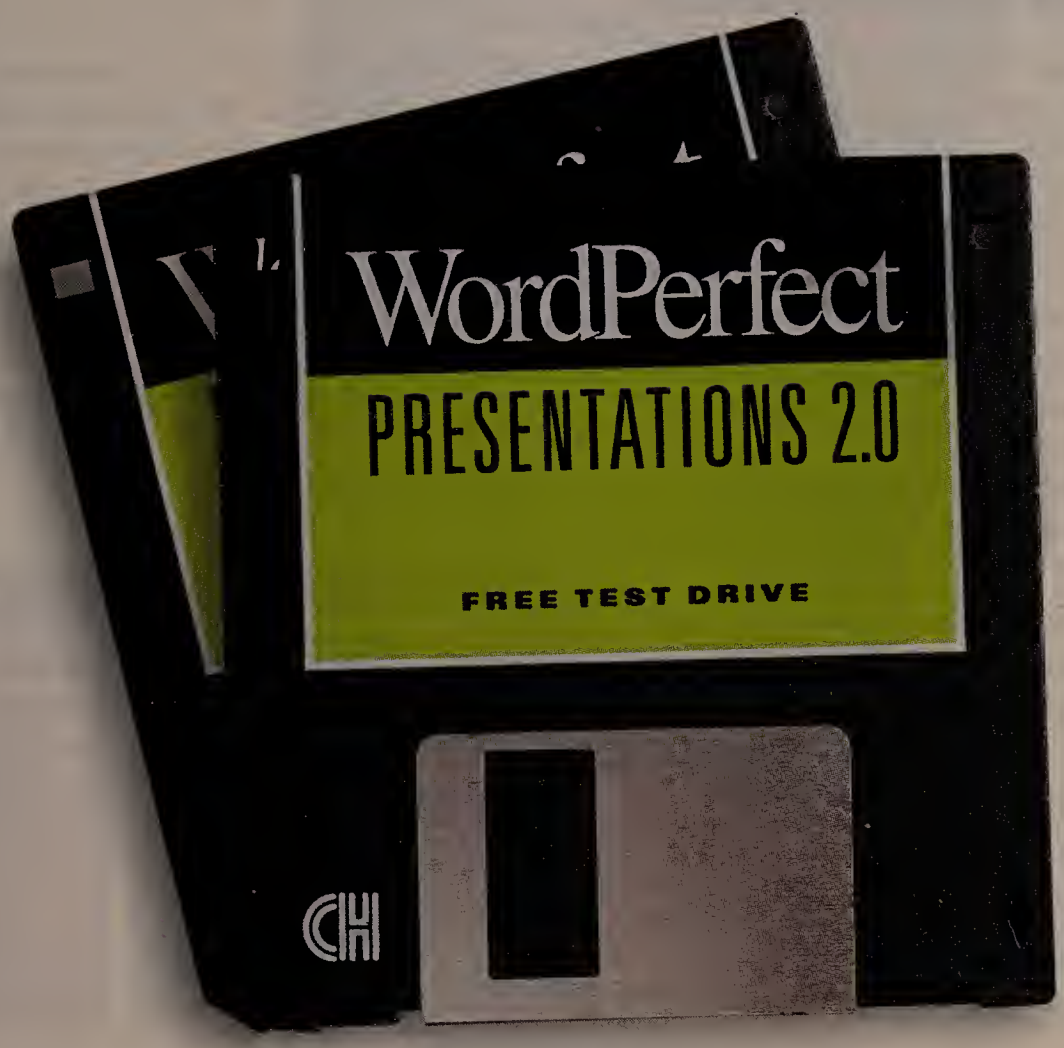
Circle 199 on reader service card

FOR THOSE WHO BELIEVE ADVERTISING.

☞ Dynamic, Windows-like Graphical User Interface (DOS has never before been this GUI)! ☞ Master Gallery of professionally designed slide templates to get you started quickly! ☞ Intuitive Button Bars™ to flatten your learning curve! ☞ Powerful Outliner to help you organize your thoughts! ☞ The only presentations package with both draw and paint tools! ☞ Mindblowing digital audio capabilities (with the appropriate hardware, record and playback WAV and VOC files)! ☞ Easy pie, bullet, surface, area, scatter, hi-lo, bar, organization and other charts, many in 3-D! ☞ Split-screen chart editor! ☞ 256-color palettes customizable from a universe of more than 16 million colors! ☞ Dazzling special effects like contoured text, blending and shadows! ☞ A library of over 100 MIDI music files (classical, jazz, country, pop, new age and more)! ☞ More than 1,000 clip art images to work with! ☞ Supports more than 20 popular sound cards! ☞ Import scanned images! ☞ Edit bitmaps pixel-by-pixel! ☞ Exclusive Autotrace feature that converts bitmaps to vector-based images! ☞ Diagonals, overlays, screen pours, on-screen highlighting and more for exciting on-screen transitions! ☞ Unique DOS Slide Sorter–just click and drag to rearrange! ☞ Automatically generated handouts and speaker's notes! ☞ The industry's best toll-free customer support in the U.S. and Canada! ☞ And that's just the beginning!

WordPerfect®

FOR THOSE WHO DON'T.



Try it free. Call (800) 526-5058.

WORDPERFECT IS A REGISTERED TRADEMARK AND BUTTON BAR IS A TRADEMARK OF WORDPERFECT CORPORATION WITHIN THE UNITED STATES AND OTHER COUNTRIES. ALL OTHER BRAND AND PRODUCT NAMES ARE TRADEMARKS OR REGISTERED TRADEMARKS OF THEIR RESPECTIVE COMPANIES. ©WORDPERFECT CORPORATION 1993

Polywell Poly 486-33V

VITAL STATISTICS

Direct price: $1250
Processor: 486SX-33
PROS: Fast; five-year labor warranty; OverDrive for DX2 socket
CONS: 60MB hard disk
Contact: Polywell Computers, 800/999-1278, 415/583-7222
Reader service no. 689

The Poly 486-33V is value enough to barely miss a Best Buy. It hit our price right on the nose while providing 4MB of RAM, a 128K secondary RAM cache, local bus video and drive controllers, *and* a 238-pin Intel ZIF socket that will accept Intel's projected OverDrive for DX2. The drawback edging it out of the winner's circle was a 60MB hard disk—within our minimum guidelines, but the smallest here. This 33-MHz Intel 486SX's performance missed the fastest five overall by a single percentage point.

The system has two local bus slots and five 8/16-bit slots. This configuration leaves four slots free, with the VESA slots filled by an Orchid local bus graphics accelerator with 1MB of DRAM and a local bus drive controller card. Two external and one internal drive bays remain free.

Polywell service and support offers an uncommon plus. When your one-year parts and labor warranty runs out, the company will provide free repair and labor for four additional years. If you need on-site service, you can buy a year for $75. The six-day-a-week technical support is responsive and accurate. Fax support rounds out the service picture. As we said, this system missed a Best Buy by a whisker in a review that's so packed with great deals it gives new meaning to the phrase "no room at the top." Any way you look at it, this is a superb PC. The only thing keeping it from being a super *Windows* machine is its small 60MB hard disk.

Quill Qtech PCS-4S25

VITAL STATISTICS

Direct price: $1099
Processor: i486SX-25
PROS: Excellent price
CONS: Mediocre performance, no toll-free support
Contact: Quill Computer Products, 708/634-6650
Reader service no. 690

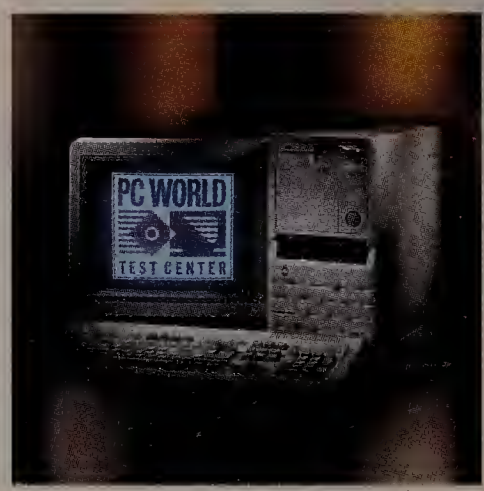
Misers take note: The Quill Qtech PCS-4S25-2 combines an Intel 486SX-25, 4MB of RAM, and an 80MB hard disk—and serves it up for under $1100. And of the 25 systems we reviewed here, only the Netis Technology N425VL system costs less. The system comes housed in a handsome compact case that gives you three unfilled drive bays, all of which are externally accessible.

The system has six free slots (three 8 bit and three 8/16 bit) and will support any of the current Intel OverDrive CPUs—all the way up to 66 MHz if you swap out the current system clock for a 33-MHz oscillator. One important caution before you put on the pressure it takes to seat a new CPU, however: The end of the motherboard under the upgrade socket is unsupported. Better brace it—or chance cracking the system board.

The possibilities of a buyer wanting to upgrade quickly are strong. This system was slow in our tests, uncomfortably close to the bottom overall and last on the *WordPerfect* test. We suspect that the absence of secondary memory caching has something to do with this lackluster showing. Unfortunately, there's no provision for a RAM cache upgrade.

If you value longevity, Quill is a company that's been selling business products since 1956. The two-day turnaround policy, year of free on-site service, and BBS and fax support are great. And we received good advice, although we had to wait 2 to 3 hours for some callbacks. Our main complaint is the absence of toll-free support lines. The Quill Qtech PCS-4S25 isn't a bad system, although it's not a wise choice for those who value top performance.

Silicon Valley SVC 486SX/33 35 Pylon II



VITAL STATISTICS

Street price: $1215
Processor: i486SX-33
PROS: Fast; two-year warranty
CONS: Conditional service and support
Contact: Silicon Valley Computer, 415/967-1100
Reader service no. 691

The Silicon Valley SVC 486SX/33 35 Pylon II is a speedy machine at a tempting $1215 price. You get a 33-MHz Intel 486SX with 4MB of RAM and an 80MB hard disk. That's not bad, considering that this system zipped past five of the other seven 33-MHz 486s to finish in a virtual tie for fourth on the *Harvard Graphics* test.

The minitower unit has three externally accessible bays free. The baby motherboard provides six free slots and supports OverDrive processors to 66 MHz.

Everything sounds great so far, right? Great speed, attractive price—if only service and support could match the rest of the package. Don't get us wrong: There's nothing wrong with the two-year warranty. But Silicon Valley's central end-user support is available only to users who buy direct. Silicon Valley provides dealers with a dedicated support line, but it doesn't require training or keeping an inventory of parts in stock. The company recently added an on-site service option for $99 a year and has a very slow service turnaround of a week or longer. As a system manufacturer, SVC obviously knows what it's doing, but it needs to add just a little more polish to its service and support to match up to our Best Buys.

Hassled by Medical Claims?

Simplify your life with *Med$ure*®, Your Health Insurance Manager.™ Helps you *file and track* claims painlessly.

MED$URE DOES IN MINUTES WHAT TAKES YOU HOURS.

It will take a bill from your doctor or drug store, and turn it into an insurance claim you can print and mail in minutes.

Med$ure will track the claims you've filed from initial bill to final payment. It will resubmit claims to secondary carriers, and flag all unresolved claims until you are satisfied.

SAVE MONEY WITH MED$URE.

Know how much money you are spending on health care, including premiums and out-of-pocket costs. Spot duplicate or over payments. See where you are in deductible and coinsurance. Learn how to handle rejected claims to recoup the money you are owed.

CHOOSE PLANS WISELY.

Med$ure will systematically compare any number of health insurance plans based on your unique family profile. When both spouses work, Med$ure will choose the best option for each. Something only a computer could do.

YOU CAN TRUST MED$URE.

Med$ure is award winning software that has saved time and money for thousands of users.

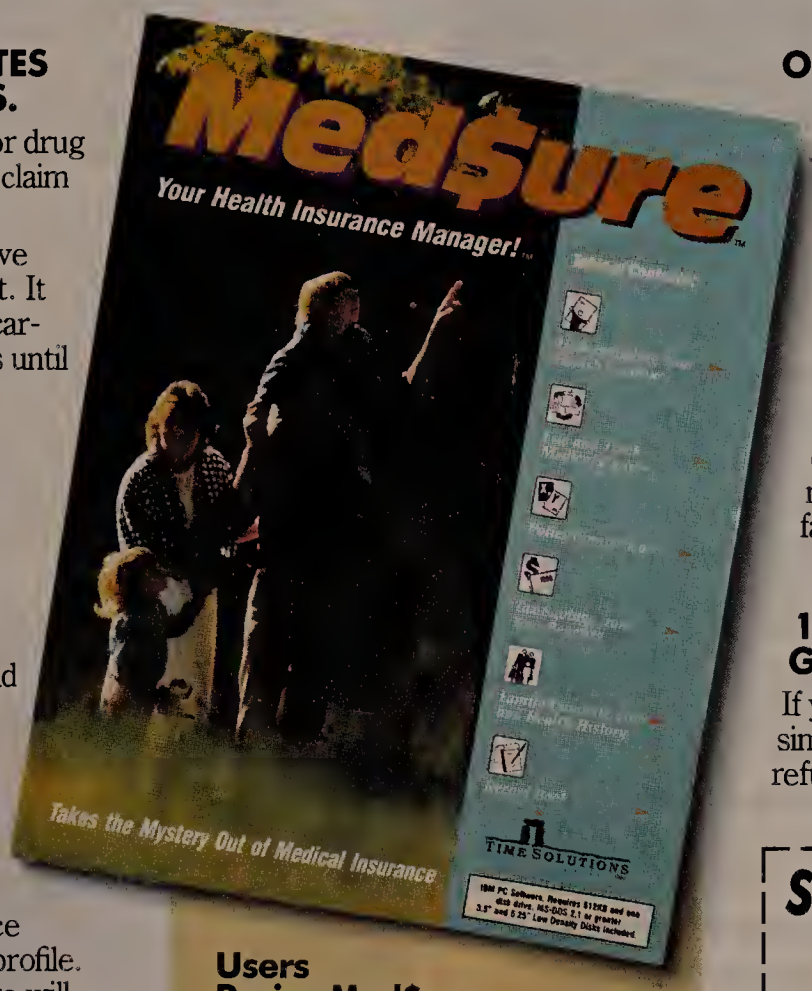
PC Computing — The Business Computing Experts

PC MAGAZINE

Home Office Computing

PC Magazine (Jan. 14, 1992) voted Med$ure "Best of 1991 Honorable Mention." They said, "It has a clean, modern, coherent interface with mouse support and lots of intelligence." **PC Computing** (Apr. 1992) says "The program is an excellent tool for organizing medical records, with cost savings that could easily recoup its $89.95 list price." **Home Office Computing** (Dec. 1992) rated Med$ure 3½ stars (out of 4). They said "Despite the sophistication of the subject matter, the program is remarkably easy to use. So easy, in fact, that I navigated the entire package with online help, never once opening the 95 page manual."

Specifications: Prints HCFA 1500 Form. 100% IBM Compatible, 512K RAM, DOS 2.11. Supports Microsoft Mouse



Users Praise Med$ure:

"I've got 5 kids. Most are grown now, but I really could have used *Med$ure* when they were young."
Lon Lee, Spokane, WA

"First time I used *Med$ure*, it found a $228 claim that had been paid by both me and the insurance company. After calling the hospital accounting office, I got a refund check."
John Michl, Omaha, NE

"I'm very impressed! Looks like I'll finally be able to manage a mountain of claims."
Willafay McKenna, Williamsburg, VA

"Exactly what I needed. In fact, it has much more than I expected."
George Burt, Lomita, CA

"Fits a need like nothing I've seen! (And I've seen a lot.) Thanks."
Dan Arnold, Van Wert, OH

"*Med$ure* has surely unscrambled my Medicare mess."
Harvey Metzler, Greenfield, MA

ORGANIZE AND TRACK A FAMILY OR SMALL BUSINESS.

Med$ure will organize and doggedly follow an almost unlimited number of claims. It will track multiple policies for your entire family or for your employees. It will coordinate benefits if more than one spouse carries insurance. It will track Medicare and Medi-Gap payments for you or your parents. It will produce an annual summary of your health care costs, by family member, for tax purposes.

100% MONEY BACK GUARANTEE.

If you are not satisfied for any reason, simply return it in 60 days for a full refund, no questions asked.

SPECIAL OFFER $69.95
Normally ~~$89.95~~

PLUS FREE BONUS!
Order Now and get Claim Forms Starter Kit. (Includes 20 claim forms — Standard HCFA 1500)

☐ **YES, send me Med$ure for $69.95**
Plus $5.00 shipping in U.S.

Indicate Preference:
☐ Laser ☐ Tractor Feed

SEND TO: Time Solutions®
45 Kellers Farm Rd.
Easton, CT 06612

Name _____
Address _____
City _____
State/Zip _____
Daytime Phone _____
☐ VISA ☐ MasterCard ☐ Check Enclosed
Card Number _____
Exp. Date _____/_____
Signature X _____

Call 800-552-3302 To Order
or Fax to (203) 268-1812
CT residents add sales tax.

TIME SOLUTIONS INC ®
personal software
(203) 459-0303 PCWAAP

Circle 173 on reader service card

Tandy 425 SX

VITAL STATISTICS

Street price: $1324
Processor: i486SX-25
PROS: Widespread, accessible dealer network
CONS: Mediocre performance, no toll-free central support
Contact: Your local Radio Shack store or dealer
Reader service no. 692

Many buyers depend on hands-on access when they make a PC purchase, and they want to discuss any problems in person. Tandy has always appealed to that kind of buyer. Purchasing a Tandy system is as convenient as a visit to a local Radio Shack, and the company's longevity promotes buyer confidence. Tandy started a factory-direct program last fall to augment its carryout sales. You work with a Radio Shack representative in the store to configure your system. The rep phones in the order, Tandy custom-configures your PC, and you get the system within five business days.

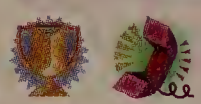
The low-profile Tandy 425 SX came in at $1324—over our target price—although the company threw in *Windows* and a mouse. If you use *Windows*, however, spend the extra $45 it takes to bump the 2MB of RAM up to 4MB. Tandy didn't fill the sockets, but there's space for 256K of secondary RAM cache next to the soldered-down 486SX-25 and upgrade socket. A 128K cache would add $69 to the price, but this PC could use the boost, as the Tandy was second to last or last on every benchmark: Accessibility to the five free slots and two free externally accessible bays is good.

Tandy gives depot service where you bought your PC but doesn't require dedicated staff. On-site service runs $129 for the first year. When we called central tech support, we experienced long waits—frustrating when the call is on our dime. Tandy is a solid company, but you can get better performance and service elsewhere.

USA Flex 486SX/25

VITAL STATISTICS

Direct price: $1249
Processor: i486SX-25
PROS: Excellent service and support, local bus video and drive control
CONS: None
Contact: USA Flex, 800/846-0002, 708/351-9700
Reader service no. 693



From experience, we expect USA Flex to come up with good, innovative PCs. But in the area of service and support, high expectation has turned into certainty. With that in mind, we're pleased to report that USA Flex has put together another Best Buy combo with its USA Flex 486SX/25. The machine is good—and service and support is better than ever.

USA Flex put together a cunning blend of new-age components to enhance performance, such as a motherboard with two VESA slots, a hot local bus graphics accelerator, and a 32-bit drive controller. Performance on our disk-intensive *Paradox* test bears witness to the controller's success: Only two other 486SX-25s did better. With a 66-MHz OverDrive upgrade path available, these enhancements guard against obsolescence. USA Flex provided 4MB of RAM, a 256K secondary RAM cache, *Windows*, and a mouse. The compact case accommodates four free accessible drive bays, and the motherboard provides six free slots.

As we said at the outset, USA Flex service and support are great. Responding to your need for protection in a changing market, we recently tightened our already tough service ratings. USA Flex ran our new gauntlet unscathed, right on the heels of the top-rated Micro Express. USA Flex also has responsive 24-hour year-round toll-free support. If your problem can't be handled on the phone, an on-site service rep will visit you free for the first year. BBS and fax support round out the service lineup. When we planned this low-cost roundup, we expected to get nothing *but* 486SX-25s for review. Even after checking out the Best Buy USA Flex 486SX/25's powerful competition, we've decided we'd still be happy to get this one.

Xinetron X/LAN Station 486SX

VITAL STATISTICS

Direct price: $1249
Processor: i486SX-20
PROS: LAN port, 3-year warranty
CONS: Mediocre 486SX-20 performance
Contact: Xinetron, 800/345-4415, 408/727-5509
Reader service no. 694

The handsome, super-slimline Xinetron X/LAN Station 486SX is a plug-and-play LAN client, ready to connect and configure right out of the box. Ours came with an ethernet option, which handles either Coaxial Thinnet or 10Base-T, and Xinetron also offers an Arcnet option. Both of these LAN cards fit the Xinetron's special slot-saving motherboard connector. The system provides four free horizontal card positions. Xinetron did well to fit four bays into this tiny package, leaving both an externally accessible and an internal bay free. You can't install a 5¼-inch floppy drive in this PC, however, as all the bays are 3½-inch form factor.

In its quest for ultimate versatility, Xinetron's motherboard can handle everything from a 386DX through a 66-MHz 486 OverDrive CPU and Intel, Cyrix, and Weitek math coprocessors. Because of this machine's 20-MHz 486SX, it's a relatively pedestrian performer, winding up close to the bottom overall.

The warranty is an outstanding three years, technical support is toll-free, and Xinetron offers both BBS and fax support. By the time you read this article, Xinetron will have finalized pricing on an on-site service option. The Xinetron entry isn't a bad network workstation, but for our money, it needs a faster processor.

New Cx486DLC-40, i486SX-33 Almost Match i486DX-50!

	WordPerfect 5.1	1-2-3 3.1	Harvard Graphics 3.0	Paradox 3.5
Auva 486DX/50 Model S10 (Intel 486DX-50)	149	158	282	319
Micro Express ME 486DLC/40* (Cx486DLC-40)	122	238	244	350
Acma 486SX-33 VESA* (Intel 486SX-33)	157	212	307	337
Blackship BLK 486DX/33 LB* (Intel 486DX-33)	170	200	315	383
ATronics ATI-486SX/33 (Intel 486SX-33)	177	217	304	349
Polyweli Poly 486-33V (Intel 486SX-33)	157	210	312	434
Silicon Valley SVC 486SX/33 35 Pylon II (Intel 486SX-33)	170	223	305	376
ATS 486-33 (Intel 486DX-33)	178	210	362	386
Insight 486-33 MHz ValueLine (Intel 486DX-33)	173	202	341	438
Diamond DT 486DLC/40* (Cx486DLC-40)	185	236	311	494
Packard Bell PB425/8 (Intel 486SX-25)	157	259	410	454
AST Bravo 4/25s (Intel 486SX-25)	171	267	349	452
Keydata 486SX/25 Keystation (Intel 486SX-25)	184	264	339	439
Netis N425VL (Intel 486SX-25)	185	263	358	443
Dell 425s/L (Intel 486SX-25)	177	264	349	492
USA Flex 486SX/25* (Intel 486SX-25)	196	267	399	448
First Computer FCS 486SX-33 (Intel 486SX-33)	201	242	370	528
MiS 425SX (Intel 486SX-25)	195	272	378	472
Gateway 2000 4SX-25 (Intel 486SX-25)	182	286	440	505
CAF Gold 3D (Intel 486SX-25)	206	281	410	509
ALR Flyer SD 4/25s Model 80DW (Intel 486SX-25)	202	307	370	540
Xinetron X/LAN Station 486SX (Intel 486SX-20)	211	285	452	534
Quill Qtech PCS-4S25 (Intel 486SX-25)	223	289	410	534
CUi Advantage 486/25SX (Intel 486SX-25)	202	276	647	475
Tandy 425 SX (Intel 486SX-25)	213	305	456	552

***Best Buy**

Systems are arranged in order of overall speed, from fastest at top to slowest at bottom.

All tests results in seconds.

Methodology
We asked vendors to send us a 486 system with at least 2MB of RAM, one floppy drive, a 60MB hard drive, a VGA controller with color monitor, a keyboard, and DOS 5.0. We configured all our applications for standard VGA mode (640 by 480 pixels at 16 colors for graphical applications and 80 columns by 25 lines for text-mode applications).

WordPerfect 5.1
We start with a simple memo, employ a variety of common formatting features, add several pages of text, and print the result. Then we load a large formatted document and add a graphic. We preview the result several times and print the document.

1-2-3 3.1
We use several worksheets and recalculate each several times based on different assumptions, starting with a variable-rate mortgage projection. Using a series of worksheets, we examine a budget model and create several charts and a summary. Finally, we print and save the altered worksheets.

Harvard Graphics 3.0
We launch a script to create a series of slides based mostly on prepared spreadsheets. We include a title page with an embedded graphic, a series of charts, and a table of data. After previewing the entire presentation, we print it.

Paradox 3.5
To exercise *Paradox*'s relational capabilities, we post several transactions to an order-entry database (which includes several linked tables). We perform a series of queries and print a set of mailing labels.

Data based on tests designed and conducted by the PC World Test Center. Testing performed by Susan Silvius and Ulrike Diehlmann. All rights reserved.

Nobody has eve
into a laser pri

*Epson laser printers have won scores of industry awards, including PC World's "Best Buy" and InfoWorld's "Recommended Product".**

Sharpest output of text and graphics, plus 13 scalable fonts (ActionLaser 1500).

Faster! 6 pages per minute, and page 1 comes out in record time.

Handles letter-size, legal, and envelopes with ease.

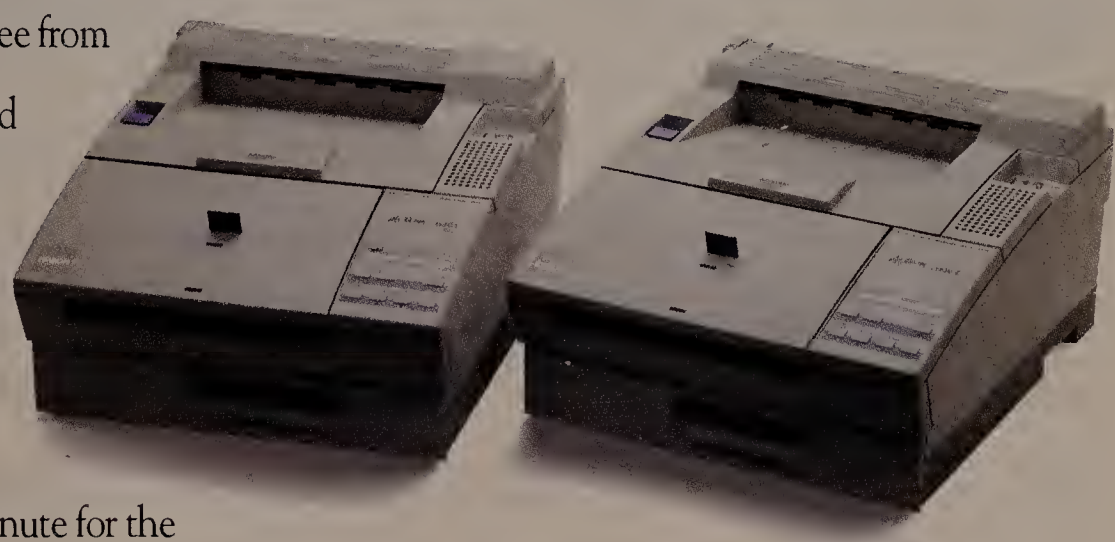
150-sheet multi-size paper tray.

Our blacks are blacker, thanks to exclusive Epson MicroArt Printing.

r piled so much nter for so little.

With a personal laser printer under $1,000, you normally have to give up one thing for another. Like speed. Or print quality. Or flexible paper handling.

Well, the new Epson® ActionLaser™ 1000 is way under $1,000. And as you can see from the large stack on the left, we've piled more into it than any other printer in its price range.



Like speed, for example. We clock in at 6 pages per minute, compared with a slow 4 pages per minute for the leading laser in the same price range.

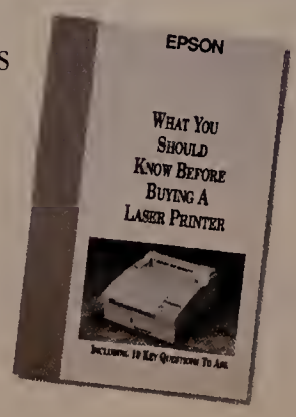
Then there's print quality. Our blacks are blacker and our lines print finer, thanks to Epson's exclusive MicroArt Printing.

If you're really a stickler for sharpness, you can spend a little more (but still less than $1,000!) for our ActionLaser 1500, with Epson's RITech resolution improvement technology. As well as 13 scalable fonts.

Add a 150-sheet paper tray that handles multiple paper sizes including envelopes, and you can see why Epson laser printers win industry award after award.

Now for the things you can't see. Our ActionLasers have a two-year warranty instead of the typical one year. Plus the toll-free Epson Connection hotline to answer your questions.

Only Epson gives you so much, for so little. Even our booklet, "What You Should Know Before Buying a Laser Printer," is absolutely free. To send for it, call 800-289-3776.



EPSON

*InfoWorld's Buyer's Assurance Seal was awarded to the Epson EPL-8000 on September 14, 1992. PC World's "Best Buy" was awarded to the Epson ActionLaser II in April, 1992 and the EPL-7500 in December, 1991. All company and/or product names are trademarks and/or registered trademarks of their respective manufacturers. Epson is a registered trademark of Seiko Epson Corp. ©1993 Epson America Inc., 20770 Madrona Ave., Torrance, CA 90509. For dealer referral, call 800-BUY-EPSON (800-289-3776). In Canada, call 800-GO-EPSON. For Latin America, 305-265-0092.

FEATURES COMPARISON

All This for as Little as $1025? Believe It!

● Yes
○ No
n/a = not applicable

	BEST BUY Acma 486SX-33 VESA	ALR Flyer SD 4/25s 80DW	AST Bravo 4/25s	ATronics ATI-486SX/33	ATS 486-33	BEST BUY Auva 486DX/50 Model S10	Blackship BLK 486DX/33 LB	CAF Gold 3D	CUI Advantage 486/25SX	Dell 425s/L
Standard features										
Selling price as of 2/2/93[1]	$1249	$1198[2]	$1450[2]	$1295	$1300[3]	$1299	$1250	$1195	$1207	$1299
CPU	i486SX-33	i486SX-25	i486SX-25	i486SX-33	i486DX-33	i486DX-50	i486DX-33	i486SX-25	i486SX-25	i486SX-25
RAM installed/capacity (MB)	4/32	2/16	4/64	4/64	4/32	4/32	4/64	2/32	2/32	4/64
Secondary RAM cache installed/maximum (K)	128/256	0/0	0/256	256/256	256/256	256/256	64/1024	64/256	256/256	0/128
Number of floppy drives	1	1	1	1	1	2	2	1	1	1
Hard disk	Conner CP30084E	Conner CP30084E	WD Caviar 2120	Conner CP30084E	WD Caviar 2120	Quantum ProDrive	Quantum ProDrive	Conner CP30084E	Maxtor 7080AT	Quantum ProDrive
Hard disk size (MB)	80	80	120	80	120	80	80	80	80	80
Motherboard manufacturer	Impression	ALR	AST	ATI	Amptron	Auva	Blackship	CAF	CUI	Dell
Graphics controller	Diamond Stealth 24 VLB	WDC	Cirrus Logic	VGA Mentor	Diamond Speedstar 24X	Trident	Trident JAX-8212	Trident 9000	Oak Technologies	S3
Graphics adapter memory	1MB	512K	1MB	512K	1MB	512K	1MB	256K	512K	512K
Monitor	Mag LX1460	ALR TE1420	AST SVGA-NI N461D	CTX CVP-5468A	Shamrock SRC 1452	Samtron SC-431VII	KFC	Tatung SVGA	Goldstar 1460 SVGA	Dell DLT439
Expandability										
Free 32/16/8-bit expansion slots	0/5/1	0/3/0	0/4/0	0/5/1	0/6/0	0/4/1	0/6/0	0/4/1	0/4/2	0/3/0
VESA local bus slots/number free[7]	2/1	0	0	0	0	0	2/2	0	0	0
Externally accessible 3½-inch/5¼-inch drive bays	1/3	1/1	0/2	2/2	2/3	1/3	2/2	2/3	1/3	0/2
Internal 3½-inch/5¼-inch drive bays	0/0	1/0	2/1	1/0	3/0	1/0	1/0	2/0	1/0	1/0
User-adjustable or user-replaceable system clock	●	○[8]	○	●	●	●	●	●	●	●
Accepts OverDrive CPU	●	●	●	●	●	●	●	●	●	●
ZIF socket	○	○	○	○	○	○	○	○	○	○
Design and construction										
Case	compact	compact	compact	minitower	minitower	compact	minitower	desktop	compact	compact
Parallel/serial/mouse/game ports	1/2/0/1	1/2/1/0	1/2/1/0	1/2/0/1	1/2/0/1	1/2/0/1	1/2/0/1	1/2/0/1	1/2/0/1	1/2/1/0
Service and support										
Warranty (months)	12	12	12	12	12[10]	12	12	12	12	12
On-site service price per year	free	$9.95	free	$99	$130[13]	none	free	none	$60.35[14]	free
Turnaround policy (days at service center)	4	3	7 or more	3	2	○	2	3	1	none
Free unlimited support	●	●	●	●	●	○	●	●	●	●
Central support	●	●	●	●	●	○	●	●	●	●
Toll-free support number	●	●	●	●	○	○	●	○	●	●
Daily support (hours)	11	11	14	9	8.5	○	9	8.5	9	24
Saturday/Sunday support	●[16]	●[16]	●[16]	○	●[16]	○	○	○	○	●
Electronic BBS support	●	●	●	○	●	○	●	○	●	●
Fax support	●	●	●	●	●	○	●	●	●	●
Dedicated support staff required	n/a	n/a	○	n/a	n/a	○	n/a	○	○	n/a
Support staff training required	n/a	n/a	○	n/a	n/a	○	n/a	○	○	n/a
Dedicated support line for dealers	n/a	n/a	●	n/a	n/a	●	n/a	○	●	n/a
Inventory and parts requirement	n/a	n/a	○	n/a	n/a	○	n/a	○	○	n/a

[1] All systems include at least a 60MB hard drive and one floppy drive, VGA and color monitor, keyboard, and DOS 5.0. Selling price is either direct or the lowest price we found in calls made to multiple dealers.

[2] Includes Windows 3.1 and a mouse.

[3] Includes a mouse.

[4] Includes Windows 3.1, Central Point Anti-Virus, Central Point Backup, QA Plus, Microsoft Works for Windows 2.0.

[5] Includes mouse, OEM/FindVirus version of Dr. Solomon's Anti-Virus Software, and Stacker 2.0.

T BUY				BEST BUY								BEST BUY		
Diamond DT 486DLC/40	First Computer FCS 486SX-33	Gateway 2000 4SX-25	Insight 486-33 MHz ValueLine	Keydata 486SX/25 Keystation	Micro Express ME 486DLC/40	MIS 425SX	Netis N425VL	Packard Bell PB425/8	Polywell Poly 486-33V	Quill Qtech PCS-4S25	Silicon Valley SVC 486SX/33 35 Pylon II	Tandy 425 SX	USA Flex 486SX/25	Xinetron X/LAN Station 486SX
$1225[3]	$1199	$1495[4]	$1249[5]	$1245[3]	$1150	$1279	$1025	$1299[6]	$1250	$1099	$1215	$1324[2]	$1249[2]	$1249
Cx486DLC-40	i486SX-33	i486SX-25	i486DX-33	i486SX-25	Cx486DLC-40	i486SX-25	i486SX-25	i486SX-25	i486SX-33	i486SX-25	i486SX-33	i486SX-25	i486SX-25	i486SX-20
4/32	2/128	4/64	4/64	4/32	4/32	4/64	4/32	8/20	4/32	4/32	4/32	2/40	4/64	2/32
256/256	128/1024	0/256	64/256	256/256	128/256	0/256	64/256	128/1024	128/256	0/0	0/0	0/256	256/1024	64/256
1	1	2	1	2	2	1	1	2	1	1	1	1	1	1
Maxtor 7120AT	Maxtor 7080AT	WD Caviar 170	WD Caviar 280	WD Caviar 280	WD Caviar 280	Quantum ProDrive	Quantum ProDrive	Seagate ST3283A	Conner CP30064H	Maxtor 7080AT	Conner CP30084E	WD Caviar 280	WD Caviar 280	Conner CP30084E
120	80	170	80	80	80	80	80	245	60	80	80	80	80	80
S&A Labs	Aten	Gateway 2000	Aten	Silicon Star	Micro Express	Micronics	Free Technology	Packard Bell	Polywell	TMC	Silicon Valley	Tandy	Flex	Xinetron
OEM WD GUI Graphics Adapter	JAX-8212 VGA Graphics	WDC-90C31	DFI VG7700	JAX-8224A V1	WD OEM GUI Graphics Adapter	JAX-8223d/v2	AVGA2	Oak Technology	Orchid	Boca VGAPlus	Trident TVGA 9000	WDC	STB PowerGraph VL-24	Trident JAX-8216A/VI
1MB	1MB	1MB	256K	512K	1MB	256K	512K	1MB	1MB	512K	512K	512K	1MB	512K
Diamond Superama FM 360	KFC CK1428	Gateway CrystalScan 1024NI	Premier Innovations 41	Korea Data Systems SVGA	Micro Express	ViewSonic 1	CTX CVP5468A	Packard Bell P38538 SVGA	Polywell	Q-Tech/ Tatung CM14SBM	KFC	Tandy VGM-225	CTX CVP-5439A	Socos CM1402
0/6/0	0/4/2	0/5/0	0/5/1	0/4/1	0/5/0	0/6/0	0/4/2	0/4/0	0/4/0	0/3/3	0/4/2	0/5/0	0/6/0	0/4/0
0	0	0	0	0	0	0	2/2	0	2/0	0	0	0	2/0	0
2/3	2/3	1/1	2/3	1/2	2/3	2/3	1/3	1/2	1/2	2/3	2/2	1/2	2/3	2/0
0/0	0/0	1/0	0/0	1/0	1/1	0/0	1/0	1/0	1/1	0/0	1/0	1/0	2/0	2/0
●	●	●	●	○	●	○	●	●	●	●	●	●	●	●
●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
○	○	○	○	○	○	○	○	○	●	○	○	○	○	○
compact	desktop	compact	compact	compact	minitower	compact	compact	compact	desktop	compact	minitower	compact	compact	compact
1/2/0/0	1/2/0/1	1/2/1/0	1/2/0/1	1/2/0/1	1/2/0/1	1/2/0/1	1/2/0/1	1/1/1/1	1/2/0/1	1/2/0/1	1/2/0/0	1/2/1/0	1/2/0/1	1/2/0/0[9]
15[11]	12	12	12	18	24	12	12	12	12[12]	12	24	12	12	36
$75	none	free	none	free	$50	$45	$100	free	$75	free	$99	$129	free	[15]
2	1	none	none	1	2	1	2	4	2	2	7 or more	2	2	2
●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
●	●	●	●	●	●	●	○	●	●	○	○	○	●	●
9	9	18	12	11	24	10	10	24	9	10	9	9	24	9
○	○	●[16]	●	●[16]	●	○	●[16]	●	●[16]	○	○	○	●	○
○	●	●	○	○	○	○	●	●	○	●	●	●	●	●
○	●	●	●	●	●	●	●	●	●	●	●	●	●	●
n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	○	●	n/a	○	○	n/a	n/a
n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	○	○	n/a	○	○	n/a	n/a
n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	●	●	n/a	●	●	n/a	n/a
n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	○	○	n/a	○	○	n/a	n/a

[6] Includes Windows 3.1, mouse, 1-2-3 for Windows for Packard Bell version 1.0a, Lotus Write for Windows 2.0.

[7] Also included in free 32/16/8-bit slot count.

[8] CPU card system with 33-MHz cards available.

[9] Network ports (ethernet or ARCnet)

[10] One year parts, four years labor warranty.

[11] 15 months parts, 24 months labor warranty.

[12] One year parts, five years labor warranty.

[13] On-site service costs 10 percent of system price.

[14] On-site service costs 5 percent of system price.

[15] Price not available at press time.

[16] Saturday only.

NETWORKING FOR THOSE TRYING TO RUN A BUSINESS. NOT A COMPUTER.

If you're a Windows user, Windows for Workgroups is the easiest way to network. If you're not using Windows, it's one of the best reasons to start.

No matter what business you're in, you stand to do a lot more of it when all your PCs are working together. And Microsoft® Windows™ for Workgroups is the easiest way to connect them.

Everyone benefits from a network. You can share letters and memos. And you can share one printer instead of buying several. Groups can develop reports together. Departments can work on common files. And everybody can have access to the latest (up-to-the-nanosecond) customer database or even an accounting system. Of course, Windows for Workgroups has security features in case you don't want everybody up on all the latest.

We could tell you how well Windows for Workgroups works. But it might be more convincing if you heard it from someone like you, who doesn't have a lot of time to spend running computers.

Crest Oelke at Dairy Queen of Greater St. Louis decided on Windows for Workgroups after watching 4 of his employees try to manage the accounting for 3 operations. Now they don't have to enter the same inventory, payable and receivable data into several PCs. Instead, they enter it once into their accounting package and it's a done deal, making everyone's life a lot easier.

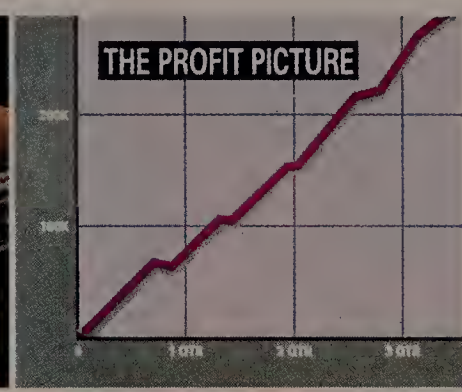
Over the next year, Crest figures he'll save around $30K. Money that might be spent on more important things. Like ice cream.

Getting started is easy. Both in effort and in money spent. You can do it yourself. Or we can put you in touch with someone who can help.

Call us at (800) 426-9400, Department JM7.

And start networking with Microsoft Windows for Workgroups. You'll be amazed how little time you spend on your PC.

And how much more time you can spend on your business.



Left: Windows for Workgroups makes it easy for groups to share files and information. Right: Which makes it much easier for you to show a profit.

Microsoft
Making it easier

© 1993 Microsoft Corporation. All rights reserved. Printed in the USA. In the 50 United States, call (800) 426-9400, Dept. JM7, for more information or a reseller referral; customers in Canada, call (800) 563-9048; and outside the 50 United States and Canada, call (206) 936-8661. Microsoft is a registered trademark and Windows and the Windows logo are trademarks of Microsoft Corporation.

A
B
C
1
2
4
5
8
9
501

CARIE HENRIE

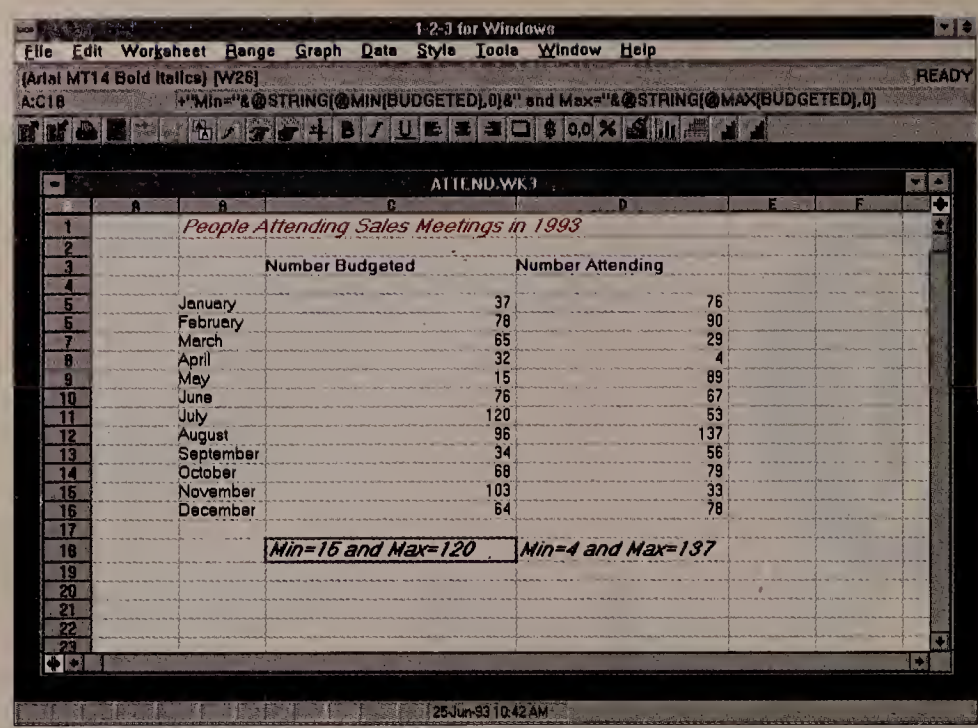
50 Spreadsheet Tips

Today's spreadsheets are smarter than you think. Unlock their power with these 50 tips, tricks, and shortcuts for Excel, Quattro Pro, and various versions of 1-2-3.

Ever get the feeling that your spreadsheet is guarding secrets about what it can really do? And who has time to coax those secrets out? You probably don't, but we do. We prowled on-line services, cornered our writers and editors, and scoured published works for clues to *Excel*, *Quattro Pro* for both DOS and *Windows*, and every flavor of *1-2-3*. From the developers who wrote the software to the people who use it every day, we tapped experts who have delved below the surface of these programs. So read on.

We've organized these tips by program so you can see at a glance which section applies to you. But remember, what works with one spreadsheet often requires only a few minor changes to work with others. For general advice that will work in any program, check out the Tips for All Types section.

Edited by Christina Wood and Michael Desmond



PUT TWO VALUES IN A SINGLE CELL with a formula that displays the minimum and maximum values in a range in any spreadsheet program.

Tips for All Types

1

Random Numbers

Need to generate random numbers? To simulate a six-sided die, enter **1** in cell A1 and **6** in cell B1. In a different cell, type the formula **@INT(@RAND()*(B1A1+–1))+A1** for *1-2-3* and *Quattro Pro* or **=INT(RAND()*(B1–A1+1))+A1** for *Excel*. (*Excel* users who've installed the Add-in Functions add-in macro can use the formula **=RANDBETWEEN(A1,B1)**.

Every time you recalculate, the formula will display a new random integer between 1 and 6. If you need a random number between, say, 100 and 400, just enter **100** in A1 and **400** in B1 and recalculate.

2

A Range by Any Other Name

1-2-3, *Quattro Pro*, and *Excel* let you assign names to cells or groups of cells. Once you assign a name to a column, row, or range of cells, you can use the name to specify that range in any formula or reference .

To create a range name in *Excel*, select the cells you want to identify, select *Formula•Define Name*, and enter a name at the prompt. To test it, enter a few numbers inside and outside the named region, and enter **=SUM(*name*)** (*name* is your range name). Your formula totals all the numbers in the range.

For all flavors of *1-2-3* use */Range•Name•Create*, enter a name, select the area to name, and press **<Enter>** twice. In *Quattro Pro* use *Edit•Names•Create* and enter the name. Do the test above using **@SUM(*name*)** to total the numbers entered in the named range.

3

Get the Most Out of That Cell

For a lean, tight worksheet, use a formula to display two or more values in one cell. Suppose you have a range named Budgeted and want to know its maximum and minimum values. The formula (using *1-2-3*'s syntax) **+"Min="& @STRING(@MIN(BUDGETED),0)&" and Max ="&@STRING(@MAX(BUDGETED),0)** will show both values in a single cell.

If the largest value in Budgeted is 120 and the smallest is 15, the formula will return the string 'Min=15 and Max=120'.

Normally it takes four cells to display this information (two for the values and two for the labels). However, this technique allows you to display all the information in a single cell.

4

Exact Matches for Lookups

The Lookup function found in virtually every spreadsheet program is handy. It lets you search a worksheet for a value. But it's not foolproof. If it can't find an exact match, it settles for the largest number less than the one you're seeking. If, say, you're searching an inventory database for a part number, you don't want approximate matches. You only want to know if the part is there.

This technique returns 'NA' if an exact match isn't found. A two-column part list named List has part numbers in the first column and descriptions in the second. Type the part number you want into a cell named Part. The formula **@IF(@LOOKUP(PART,LIST,0)=PART,@VLOOKUP(PART,LIST,1),@NA)**, which works in all versions of *1-2-3* and *Quattro Pro*, returns the corresponding description only if the part number is present.

In *Excel*, **=IF(VLOOKUP(PART,LIST,1)=PART,VLOOKUP(PART,LIST,2),NA())** is the equivalent formula.

5

Don't Divide by Zero

If you use spreadsheets to track budgets, you probably calculate percentage changes from year to year. Problem is, the formula +(*current–previous*)/*previous*, fumbles when you track a category without a value in the previous year. It's trying to divide by zero—a spreadsheet no-no. Use the IF function to test for a zero value and display a message if zero is found.

In *1-2-3* and *Quattro Pro*, use **@IF(*previous*=0,@NA,(*current–previous*)/*previous*)**. In *Excel*, use **=IF(*previous*=0, NA(),(*current–previous*)/ *previous*)**.

If you don't like the @NA or NA() function's display, you can replace it with a string such as **"No previous value"**.

6

Stock Market Format

NYSE stock market quotes are printed with a plus or minus sign, two spaces or digits, and a fraction if needed. *Excel* can display decimal values as fractions and can customize formats to match stock quotes: Select the range to format, select *Format•Number*, and select *Fraction* from the Category list box. Replace the entry in the Code box with **+?? ?/?;[Red]–?? ?/?** and select *OK*.

1-2-3 and *Quattro Pro* don't have a fraction format or let you customize your own. But you can use a pair of formulas to convert a value into a string in NYSE stock market format—and for text screens and monospaced printouts, to pad it with spaces to right-justify the quote. Assume the decimal value is in cell A1. In B1, enter **@IF(A1<0,"–","+")&@IF(@ABS(A1) <10," ","")&@IF (@ABS(A1),1," ",@STRING(@ABS(@INT (A1)),0))&" "&@CHOOSE(@ABS(A1–@INT(A1))*8," ","1/8","1/4","3/8","1/2","5/8","3/4","7/8")** (there's one space between the third, fifth, and sixth pair of quotes, and three spaces between the seventh pair). In cell C1 of *Quattro Pro*, *Quattro Pro for Windows*, or *1-2-3 for Windows*, enter **@IF(A1*8=@INT(A1*8),B1, "ENTRY ERROR")** and set right alignment for column C. For *1-2-3* only, put **@IF(A1*8=@INT(A1*8),@REPEAT(" ",@CELL("width",C1)–@LENGTH(B1))&B1,"ENTRY ERROR")** in C1. This last formula uses @CELL() to determine the width of the cell, so you'll have to recalculate (<F9>) if you change the width of column C. Also remember that you can't

perform calculations on these strings, so you'll need to use the original values in any formulas.

7

Round 'Em Up!

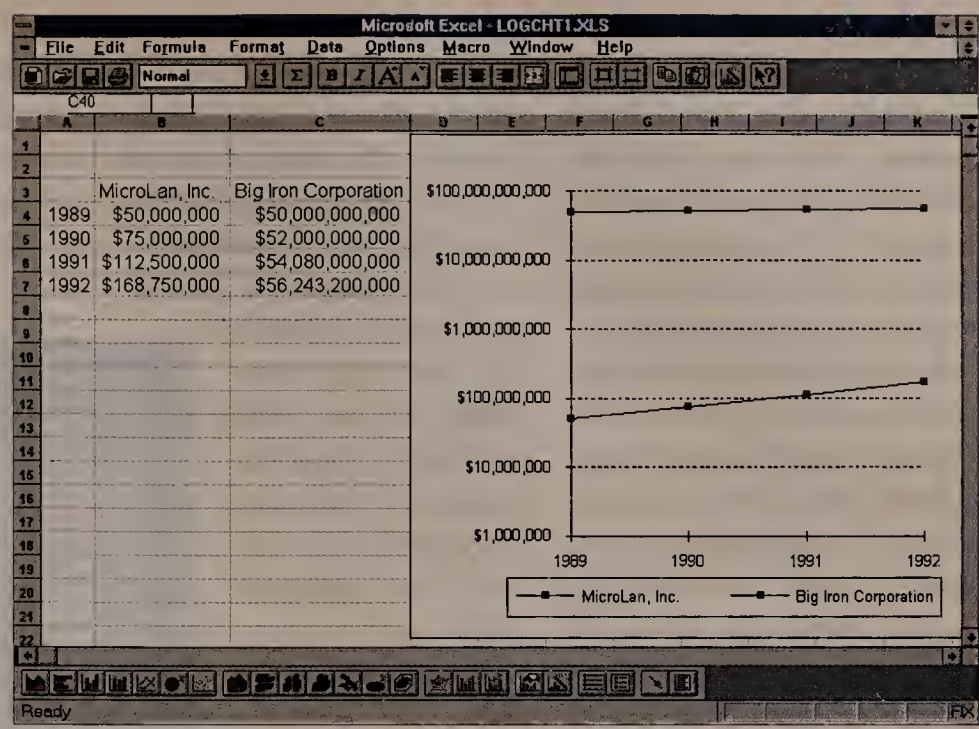
If you're calculating items that can't be divided, you might want your spreadsheet to round numbers up. For instance, to determine how many four-person cars you need to rent for 13 employees attending a trade show, you'd create a formula that divides 13 by 4—**+13/4** in *1-2-3* or *Quattro Pro* and **=13/4** in *Excel*—and use the ROUND function to round it to an integer. In this case, the value is 3.25, which the ROUND function then returns as 3. Problem is, someone will end up riding in the trunk. Trick the spreadsheet into always rounding up by adding .49 to the quotient, causing it to bump up to the next integer if things don't divide out right. (If the divisor is greater than 100 but less than or equal to 1000, add .499 instead of .49 to the quotient; if the divisor is greater than 1000 but less than or equal to 10,000, add .4999; and so on.) Your formula is **@ROUND(13/4+.49,0)** for *1-2-3* and *Quattro Pro* and **=ROUND(13/4+.49,0)** for *Excel*. You can also replace the number 13 in these formulas with a cell address or name—and enter the number of attendees in that cell—to make repeated calculations simpler.

8

Copy Formula Parts

Here's a *Windows*-only tip: Everyone knows when you use the Clipboard to copy cells and ranges of cells, *Windows* adjusts the copied formula's relative references to reflect the move. But if you paste the copy while editing a cell, you can bypass the reference adjustment and get an exact copy. You needn't copy an entire cell: Just copy a piece of a cell's formula by selecting that portion on the editing bar.

In *Excel* and *Quattro Pro for Windows*, both *Edit•Copy* and *Edit•Paste* work when you're editing a cell. You can also use **<Ctrl>-<Insert>** and **<Shift>-<Insert>**, respectively, to cut and paste. In *1-2-3 for Windows*, you must use the keyboard commands because you can't access the menus while editing a cell.



A LOGARITHMIC CHART shows the relative change of each of these two companies much better than a standard bar chart does.

9

Logarithmically Scaled Charts

A bar chart comparing a $50 billion company growing at 4 percent with a $50 million company growing at 50 percent fails to show the small company's million dollar changes. A logarithmically scaled chart clearly shows the relative differences between the companies. In *Excel*, select a type of chart from the Gallery menu; in the dialog box, you can identify a logarithmically scaled chart by the grid lines squeezed together toward one end of the chart selection icon. If the type you want doesn't offer log scaling, select it anyway, then select the chart's *Y*-axis. From the menus select *Format• Scale•Logarithmic Scale*. In *1-2-3/W*, use *Chart•Axis•Y or 2nd Y•Logarithmic*. In *Quattro Pro for Windows*, select *Property•Y Axis•Log*.

10

What's the Correlation?

The best way to detect a correlation between two sets of data—say monthly advertising expenditures and monthly sales—is to calculate the correlation coefficent. A positive coefficient means more advertising is associated with more sales. A negative coefficient means months with more advertising generally have lower sales (bad news). A coefficient near zero means sales and advertising expenses don't correspond in any systematic way. (The coefficient ranges from –1 to +1.)

Assume you have two ranges called Advert and Sales (note: they must have the same number of values). In *1-2-3*, select */Data•Regression•X-Range*, type **Advert** (or press **<F3>** and select the range), and press **<Enter>**. Select *Y-Range*, type (or use **<F3>** to select) **Sales**, and press **<Enter>**. Now select *Output Range* and specify the upper-left cell of any blank four-column-by-nine-row area. Select *Go* to calculate. To find the correlation coefficient, calculate R Squared's square root and make it negative if X Coefficient(s) is negative: In the cell where you want the result to appear, enter **@IF(** and point to the cell that contains the value of the X Coefficient(s). Type **<0,–@SQRT(** and point to the cell containing

FIND THE CORRELATION BETWEEN TWO SETS OF DATA with a formula that plots the correlation coefficient in any spreadsheet program.

the value of R Squared. Type **),@SQRT(** and point to R Squared's value again. Press **))<Enter>**. Note that if the data changes, you must rerun the regression (*/Data•Regression•Go*) to update regression data and the correlation coefficient.

This example uses *1-2-3*, but you can get these results from *Quattro Pro* and *Quattro Pro for Windows* using the *Tools•Advanced Math•Regression* command: Use **<F3>** to set Independent to **Advert** and Dependent to **Sales** and indicate any empty cell for Output. Then set up the square root formula. In *Excel*, there's no need to deal with regression or *X* coefficients: Simply enter **=CORREL(ADVERT, SALES)** in any blank cell.

11

Correlation Revisited

If your spreadsheet has a built-in function called SUMPRODUCT there's another way to calculate a correlation coefficient: Assume the two ranges are called X and Y (they must have the same number of values). The formula **(@COUNT(X)*@SUMPRODUCT(X,Y)@SUM(X)*@SUM(Y))/(@SQRT(@COUNT (X)*@SUMPRODUCT(X,X)-@SUM(X)^2)*@SQRT(@COUNT (X)*@SUMPRODUCT(Y,Y)-@SUM(Y)^2))** will return the correlation coefficient for the two sets of data. (In *Excel*, you need to start the formula with = and omit all of the @ signs.)

1-2-3 for DOS

12

Get There With End

To see all 8192 rows and 256 columns of a worksheet, your screen would have to be 7 yards wide and 61 yards long. That's why the <End> key is so useful. Press **<End>** followed by **<Home>** and the cell pointer jumps to the bottom right corner of the *active* portion of a spreadsheet. Put the cell pointer on a blank cell and press **<End><Right>** and the pointer jumps to the *first* non-blank cell. If no non-blank cells are in that direction, the pointer jumps to column IV. Put the pointer on a non-blank cell and press **<End><Right>** to jump to the cell before the next blank cell (the *last* non-blank cell in that range of non-blank cells).

13

End Tedious Formulas

Jumping around with the <End> key (see tip 12) is also useful for creating formulas. Say you want to total a column of numbers. Type **@SUM(** in the cell where you want the total to appear. Move the cell pointer to the top of the column of numbers (on the first number you want to include). Press **<Period>** to anchor the range. Then press **<End><Down>**. The pointer jumps to the last number in the column, highlighting the cells, and adding their range address to your formula. Type the close parentheses and you're done.

14

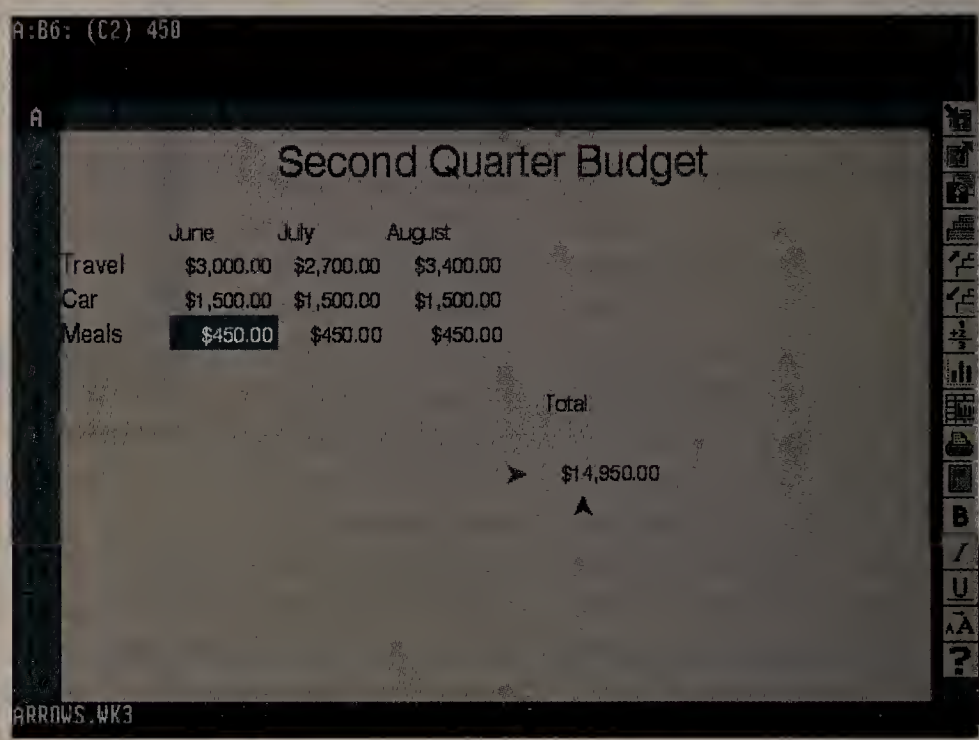
Navigating Directories

When you select */File•Retrieve* in *1-2-3*, you get a list of worksheets, if any, in the current directory. You can press **<Backspace>** to work back up the directory tree if there's a worksheet or subdirectory in that directory. (However, <Backspace> will lose that function if at some point you select a directory that doesn't have a worksheet or subdirectory.)

15

Doing Negative Numbers

It's easy to display negative numbers in parenthesis in release 2.2 and later spreadsheets. First format the cells where the numbers will be displayed with */Range•Format•*, or */Range•Format•Currency*. Then change the global default for numbers with */Worksheet•Global•Default•Other•International•Negative•Parenthesis•Quit•Quit*. If you want negative numbers always displayed in parentheses, rather than just in the current session, choose *Update* between the two Quits.



TURN ORDINARY SYMBOLS ON THEIR EAR with a quick trick that can add emphasis to your spreadsheets.

16

What's That Range Name?

You can use *1-2-3*'s GOTO (<F5>) command to get to a named range even if you can't quite remember its name. After you press **<F5>**, press **<F3>**. *1-2-3* will list all the range names in the current document, and you can simply select the one you want. In fact, <F3> will list range names any time you are prompted for a range.

17

Fetch Wysiwyg at the Outset

1-2-3's Wysiwyg add-in can be useful, but it's also a memory hog. Only sacrifice memory for the files that need it by setting selected files to launch Wysiwyg when opened. Open a file, press **<Alt>-<F10>**, and select */Settings•File•Set*. Highlight *WYSIWYG.PLC* and press **<Enter>**. Now choose *No* and *Quit* to return to Ready mode. Although Wysiwyg will not be active this session, it will load whenever you open this file in the future.

18

Flipping Symbols

Symbol characters, such as arrows, help draw attention to parts of a worksheet. But if you can't find an arrow (or symbol) that points in the right direction—straight up, say—here's a handy trick.

In *1-2-3 3.4*, launch Wysiwyg (**<Alt>-<F10>**). Enter a centered character in a blank cell. For this example, use **^d** because that's an arrow in *1-2-3*'s Symbol font. With the cell pointer on the cell with the *d*, click on the font changer SmartIcon in the first palette (it has a big *A* and a little *a*). Keep clicking that icon to scroll through the font names (they appear at the top left corner of the screen). When you see {XSYM12}, press **<Enter>**. Press **<F2>** to edit the

cell and put your cursor after the caret (^) and under the *d*. Then press **<Ctrl>-AR<End><Ctrl>-E <Enter>**. That left-pointing arrow will now be pointing up!

19

Send Yourself a Message

You can use the @IF function to alert yourself to a certain condition in a spreadsheet—such as a balance sheet that's out of balance. In prominent, unused cells, place the functions **@IF(Bottomline <> 0,"","Out of Balance")** and **@IF(Bottomline <> 0,"","Check Bottom Line")**. Then name the cell that calculates the bottom line **Bottomline**. Every time you recalculate the worksheet, it tests for the condition. If the condition doesn't exist, the cell remains blank. If it does, the error messages 'Out of Balance' and 'Check Bottom Line' appear.

20

Avoiding the Autoexec Macro

Sometimes you want to open a spreadsheet to view its data without running its Autoexec macro. You can, of course, press <Ctrl>-<Break> if you're fast on the draw. For those with slower reflexes, there's an easier way: In a new, empty worksheet, select */File•Combine•Copy•Entire-File* and the file you want to load. This brings up the file, but omits range names and bypasses the Autoexec macro.

21

Start Macros With SmartIcons

Link your macros to *1-2-3 3.4* SmartIcons and you can run them with a mouse click. You can even customize icons with your own labels and images.

In the seventh palette, click on the icon that looks like a bold U and a pencil tip. The Assign Macro to User Icon dialog box appears. If necessary, select *Next Icon* until you find an unused icon. Click in the Icon Description field and type a line describing what your macro does. You can type the macro into the Macro Text field or indicate where it's located on your worksheet by selecting *Get Macro from Sheet*, highlighting the macro, and pressing **<Enter>**.

Click the icon with the left mouse button to run your macro. Your descriptive label shows when you put the mouse pointer on the icon and hold down the right mouse button.

22

Tricky Loan Calculation

Want to know how many payments you need to pay off a loan? Trick the @TERM function in release 2.01 and later into doing it for you. Usually, you use the function—the syntax is @TERM (*payment, rate,futurevalue*)—to calculate how many years of, for example, $2000-a-year payments it will take for your retirement savings to grow to $100,000 (if your savings earn 9 percent a year). The actual formula for this example is @TERM(2000,.09,100000). But enter a negative future value, and @TERM calculates the number of payments needed to pay off a loan. For example, to calculate how many $250-a-month payments will pay off a $5000 car loan (if you pay 1 percent interest a month), use the formula @TERM(250, .01,-5000).

1-2-3 for Windows

23

White Mice Can't Jump

If you use the mouse to move between sheets in a 3-D worksheet, you could be wasting time fumbling around. Let the <Ctrl> key put some spring in your pace. Press **<Ctrl>-<Page Up>** while in a sheet, and you instantly jump down one level. **<Ctrl>-<Page Down>** leaps up a sheet. If you want to get back to sheet A, press **<Ctrl>-<Home>**.

24

Custom SmartFill

1-2-3 for Windows 1.1's SmartFill command fills in numbers, months, and days of the week, similar to features in other spreadsheets. But it has a major advantage: You can customize the series to suit your needs. Open the SMARTFLL.INI file found in the *1-2-3 for Windows* directory in any text editor. (If it's not there, you must install the SmartPak disk that's included with release 1.1.) You'll find two series in the file that show how to lay out your own series. If you were, say, entering the names of people in your workgroup, create a new series. It might look like:

[SET 3]
ITEM1=Arnold
ITEM2=Bart
ITEM6=Garth
ITEM5=Joel
ITEM4=Lisa
ITEM3=Maggie

Order the names hierarchically, alphabetically, or any way you want. Their item numbers determine their fill sequence. Save and close SMARTFLL.INI. Go back to *1-2-3/W*, type **Bart** in a cell, select that cell and ten adjacent cells. Then choose *Tools•SmartPak•SmartFill*. The other names will appear in item-number order, starting over when the end of the sequence is reached.

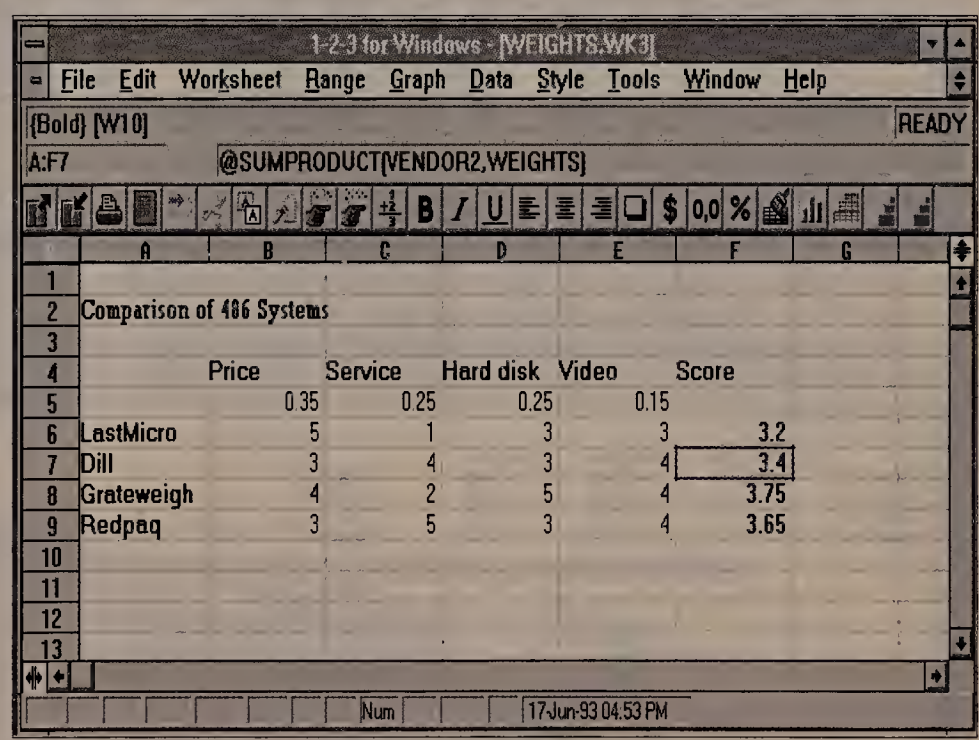
25

Supercharged Decision Making

Making decisions is confusing when considering the relative importance of many factors. Here's a macro that turns decision making into a science.

Say you want to purchase computers for your office. You've narrowed the choice to four models: LastMicro, Dill, Grateweigh, and Redpaq. You have four criteria (of various relative importance) you want to apply to your decision: price (35 percent), service (25 percent), hard disk size (25 percent), and video speed (15 percent).

Enter your four categories in columns B through E on one row. Then enter the vendor names two rows lower in column



TURN DECISION MAKING INTO A SCIENCE by weighting your choices on a spreadsheet using 1-2-3 for Windows' SUMPRODUCT function.

A. Name the vendor rows **VENDOR1**, **VENDOR2**, **VENDOR3**, and **VENDOR4**. Enter the percentage value (**.35**, **.20**, etc.) in the row under the categories to assign weights to them. Name this row **WEIGHTS**. Using data from a *PC World* review, enter a value between **1** and **5** (five is the best score) for each model in each category. Type the formula **@SUMPRODUCT(VENDOR1,WEIGHTS)** in the first empty cell in the VENDOR1 row. Repeat, using the appropriate name (VENDOR2, etc.) in the three cells below. The @SUMPRODUCT formula multiplies each score by its weight and adds them together to return a rating for each model.

Bonus Tips for 1-2-3 for Windows Release 4

Editing the Way It Oughta Be

Tired of moving the pointer up to the status line to edit your formulas? The brand-new release of *1-2-3 for Windows* makes that extra mouse move obsolete. To edit the contents of a cell right in the worksheet, simply double-click on the cell.

Fully Functional

Don't bother memorizing the exact name or syntax of the @function you want; simply click the @Function tool above the SmartIcons tool bar and select from the drop-down list box. Your function lands in the selected cell with a cheat line for the syntax in place.

The default @function drop-down box comes with a selection of commonly used commands, but you can customize that menu to include the @functions you use most often. To add, say, @DAYS—which calculates the number of days between two dates—click the @Function tool, then click *Menu*. You'll get a new dialog box. Select *@DAYS* from the list of @functions and pick a position for your new menu item in the Current Menu list box. Click *OK*.

26

Speeding Up Linked Formulas

It's easy to build linked formulas in *1-2-3 for Windows*. With two or more worksheets on the desktop, just point and click to build formulas between worksheets. You can even link both WK1 and WK3 files with the same command. (WK1 files work with *1-2-3 for Windows* as well as *1-2-3 2*.x.) Unrestrained use of linked worksheets, however, can cause serious delays when loading files.

Here are some tricks for avoiding lulls: Load the source file before the destination file, use WK3 instead of WK1 files, and build your models with multiple worksheets instead of multiple files.

27

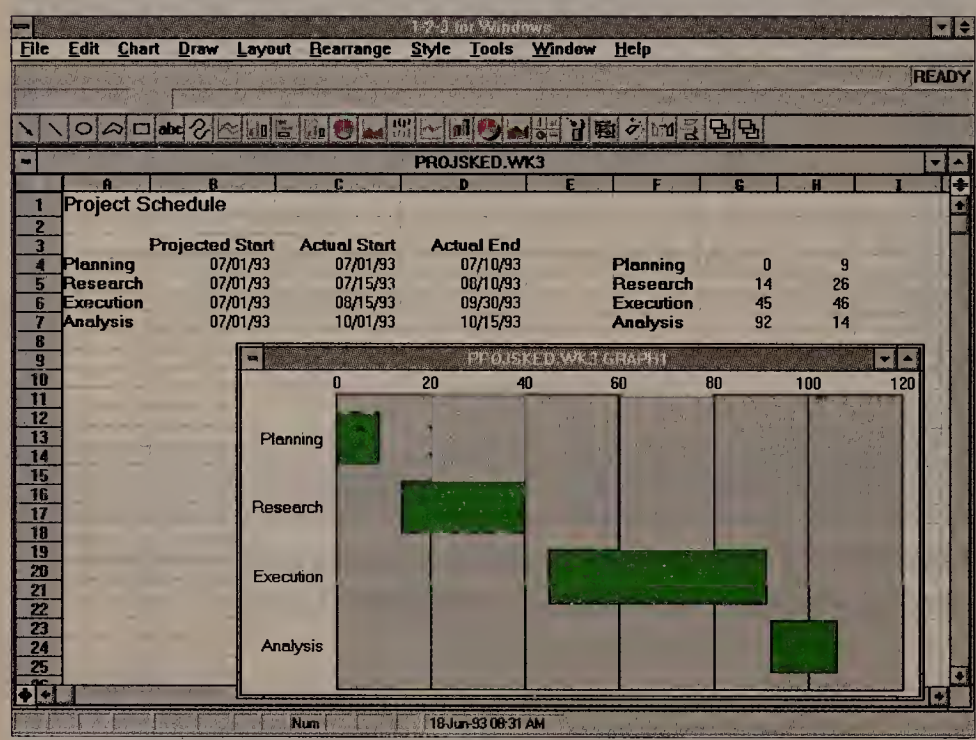
Do-It-Yourself Timeline in 1-2-3/W

Timelines help manage complex projects. But who wants to buy a project management program when *1-2-3 for Windows* can do the job?

Create a table with **Planning**, **Research**, **Execution**, and **Analysis** entered in A4..A7, and **Projected Start**, **Actual Start**, and **Actual End** entered in B3..D3 as shown in the figure below. Select B4..D7, then select *Range• Format* and type **1** to select the first date format. Our project starts on July 1, so enter **7/1/93** in all four cells beneath Projected Start. In the next two columns, enter the actual start and completion dates of each activity as shown.

Select A4..A7, select *Edit• Quick Copy*, type **F4**, and press **<Enter>**. Select G4..H7, select *Range•Format*, and select *General* from the Format list box. In cell G4, enter the formula **+C4-B4** and copy it to the three rows below. (This formula calculates how many days into the project an activity begins.) In H4, enter **+D4-C4** and copy it to H4..H7. (This calculates the days from the beginning of the activity to its end.)

Now you can create your timeline. Select F4..H7, choose *Graph• New*, and click *OK* to bring up a graph. Select *Chart•Type*, click the Bar radio button, choose *Horizontal* in the Orientation section, click the bottom chart icon in the center of the dialog box, and click *OK*. You now see a red and green colored horizontal "stacked" bar chart. Select *Chart•Options•Colors* and in the Data range colors section, click the *A* box. Choose *H* from the bottom of the color choices. Finally, click *OK* and your timeline is complete.



PLOT A TIMELINE using a 1-2-3 for Windows spreadsheet for efficient management of complex projects.

Excel

28

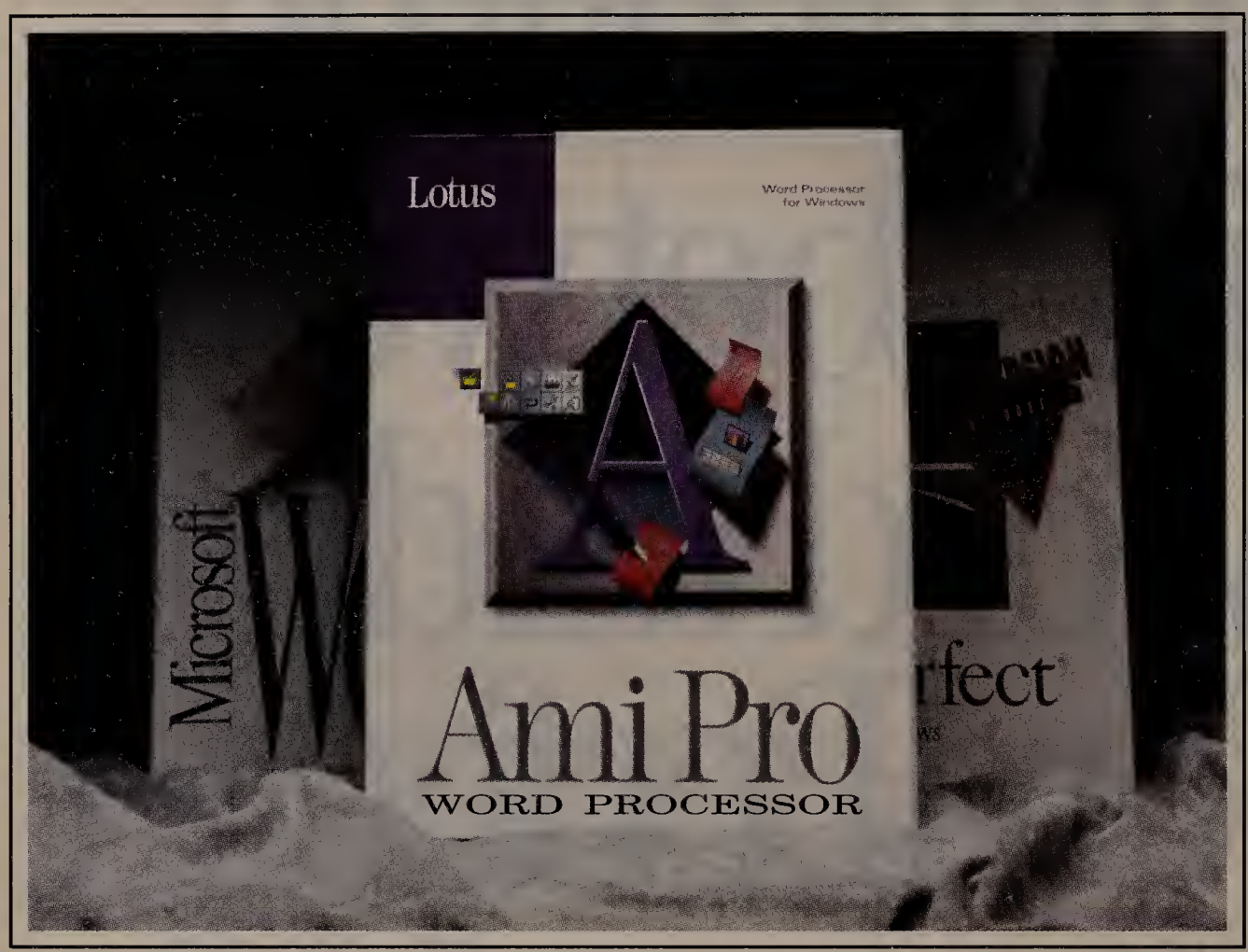
Keyboard Navigation

Drag-and-click operation has eased spreadsheet work, but all that mousing around takes time. Instead, hold down **<Ctrl>** when hitting a cursor key to jump the cell pointer from a non-empty cell to the cell just before the first empty cell in the cursor's direction or from an empty cell to the first non-empty cell in that direction. If your pointer is in a long column of entries, press **<Ctrl>-<Down>** to move it to the last entry. If the pointer is in an empty cell, hit **<Ctrl>-<Left>** to slide the pointer to the first filled cell.

Use the <Shift> key with <Ctrl>-*cursor* to select large swaths of a spreadsheet or a long list of entries. For example, to copy a row of headings, place the cell pointer in the leftmost cell of the row, then hold down

There's quite a battle raging between Word and WordPerfect.

For seco



Check the rankings.

Ami Pro 3.0 is ranked the #1 Advanced Word Processor for Windows™ by the National Software Testing Laboratories. (9/92)†

Recently, in an InfoWorld review, Ami Pro received the highest score ever given for a Windows word processor. (9/28/92)

Lotus Ami Pro captured the 1992 PC Computing MVP Award. (12/92) (Note: The MVP award also appears in the new WordPerfect ad. That's last year's award.)

PC Magazine recently named Ami Pro one of the Best Products of 1992. They said, "No other product can match...the sheer pleasure of using it." Microsoft Word received an Honorable Mention, with the comment "...it's a step behind Ami Pro." (1/93)

Now, perhaps the battle royale between Word and WordPerfect has been put into perspective.

And you probably wonder what it is that makes Ami Pro clearly better?

In the War of the Words, there's one clear winner. Ami Pro.

Word vs. WordPerfect.® It's billed as the battle of the world's two greatest word processors. Hardly.

According to most independent judges, Lotus® Ami Pro® 3.0 is the clear and convincing leader of the word processing pack. Word and WordPerfect are following its lead, scrapping it out for second and third.

†Among all word processors tested. Software Digest, Ratings Report, Vol. 9, #6, Sept. 92. Reprints available upon request. *On weekdays, plus 7AM to 4PM on Saturdays. **Offer expires 9/30/93. Call for a list of eligible word process
Cambridge, MA 02142. All rights reserved. Lotus and Ami Pro are registered trademarks and SmartIcons is a trademark of Lotus Development Corporation. Windows is a trademark of Microsoft Corporation. WordPerfect is a registered tradem

nd place.

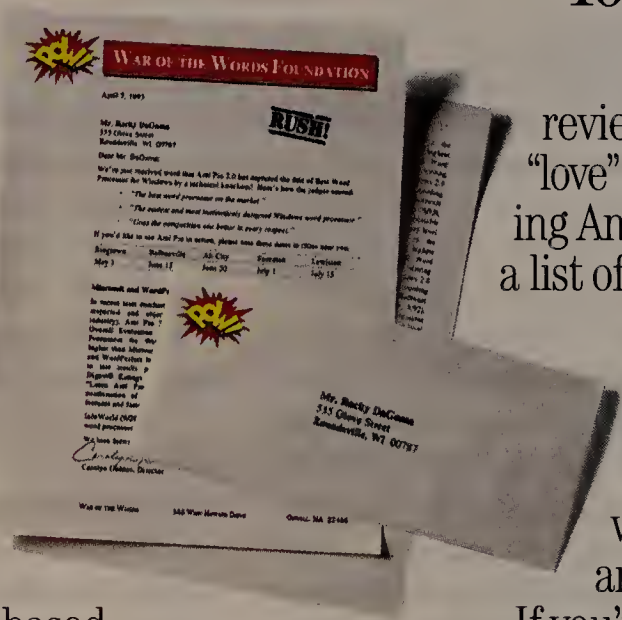
The battle of the features.

Simply put, Ami Pro is a faster, easier, friendlier word processor to use. It does so many things with so little effort, most people never even bother to open the manual.

To name a few, there's real, honest, no ifs-ands-or-buts WYSIWYG. There's Fast Format, for quick repetition of text formats. There are customizable, editable SmartIcons.™ Not to mention SmartClick, where the right mouse button will automatically shift you to the appropriate dialogue box to change fonts, styles or frame formats, based on what you're doing.

There's automatic renumbering of lists. Preview of Style Sheets. QuickStart on-line tutorial. Free 24 hour a day technical support.* And to ease your mind, a 60-day money back guarantee of your complete satisfaction.

And, if you're switching from WordPerfect for DOS, relax. Ami Pro makes it easy with a number of special features. Like seamless conversion of WordPerfect files. And a SwitchKit so that when you type in WordPerfect commands, Ami Pro shows you how to perform the same functions using pull-down menus or one-click SmartIcons.



You call the winner.

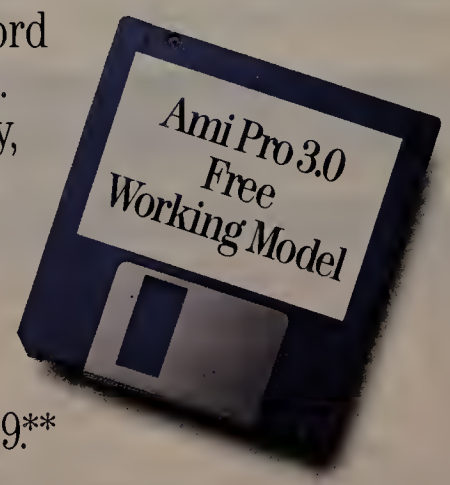
So what drives hardened reviewers to use words like "love" and "pleasure" when describing Ami Pro? You can't tell from a list of features.

You've got to experience it. In your office. On your PC.

Call us for a free working model of Ami Pro and you'll see for yourself.

If you're like most people, once you actually sit down with Ami Pro, you'll definitely choose it. Over Word. Over WordPerfect. Over every other word processor out there.

Call Lotus today, at **1-800-872-3387, ext. 8760**, for your free working model or to upgrade from your current word processor for just $129.**



Lotus. **Ami Pro 3.0**

Word Processor for Windows

ation-priced Lotus products not included. Offer valid in U.S. only. Not to be combined with any other offer. Have your current word processor ready when you call. ©1993 Lotus Development Corporation, 55 Cambridge Parkway, ordPerfect Corporation. Software Digest is a registered trademark of NSTL, Inc., a McGraw-Hill Company. Adobe Type Manager and the ATM logo are registered trademarks of Adobe Systems, Inc. In Canada call **1-800-GO-LOTUS**.

<Ctrl> and <Shift>, and press <Right>. The pointer ends up at the last filled cell prior to an empty cell, with all the intervening cells selected. If you have some empty cells along the row, continue to hold down <Ctrl>-<Shift> while you tap <Right> a couple more times.

29

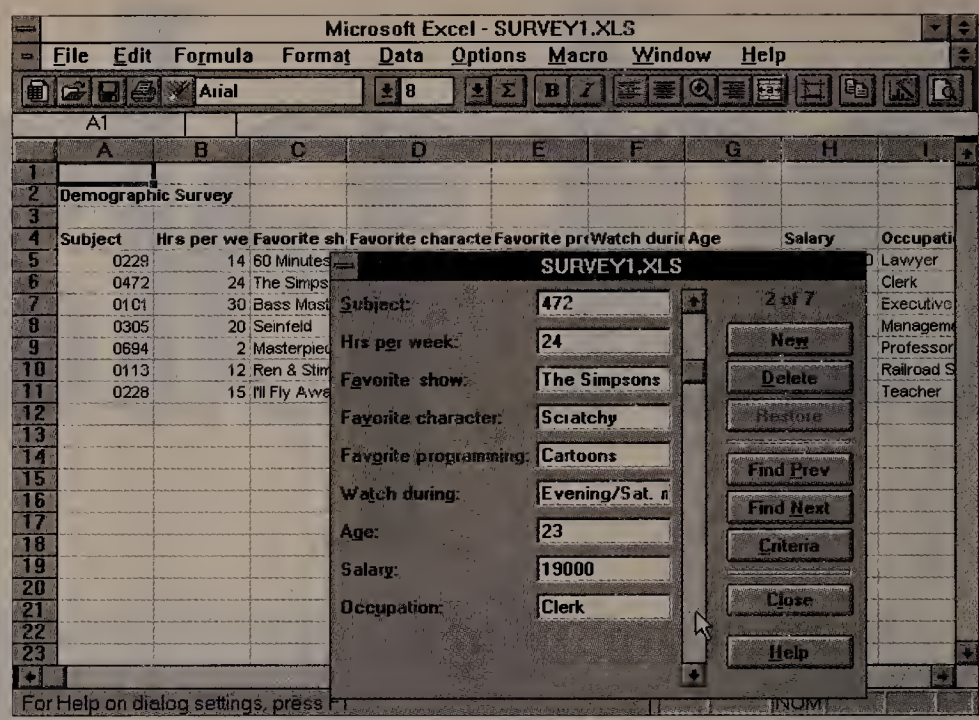
Automatic Decimal Points

Save time and keystrokes during data entry by letting *Excel* do some work for you. When entering financial data, or anything requiring two digits after a decimal point, select *Options•Workspace* and check the Fixed Decimal checkbox (make sure the Places text box reads 2). Values are now entered with a decimal point. Now an entry of 54321 appears as 543.21. Note that the word FIX appears in the status line. To return to normal when you're finished, select *Options•Workspace* and deselect the Fixed Decimal checkbox.

30

Chart Templates

Let templates set up commonly used charts for you. Create the chart as you like, select *File•Save As* and in the Save File as Type list box, select *Template*. *Excel* adds the XLT extension, but you need to supply an identifying name—for example, SALES-CHT.XLT. Then in the Drives and Directories list boxes, locate XLSTART, click *OK*, and restart *Excel*. Next time you want to create a similar chart, select your data and choose *File•New;* your template name will appear in the New list box. Double-click it and a ready-made chart will appear.



EXCEL'S DATA FORM COMMAND makes data entry a snap—even if you're not creating a database.

31

Cosmetic Surgery in Excel

Excel normally uses 10-point Sans Serif for cell entries and row and column headings. But you can change that. For a group presentation, for instance, you might want a larger point size or a different typeface. To change the default font to 20-point Arial, open the EXCEL4.INI file (found in your *Windows* directory) in any text editor and under the [Microsoft Excel] section of the file, enter the line **FONT=Arial,20**. If you want to use a different font, toggle to *Excel*, select *Format•Font*, and look in the resulting list box for a list of your installed fonts. The new default font takes effect when you restart *Excel* (old files, however, retain the original default font).

32

An Easy Way to Change Names

If you've named a range and created formulas that use that name, you must live with that name forever, unless you want to edit every formula. Right?

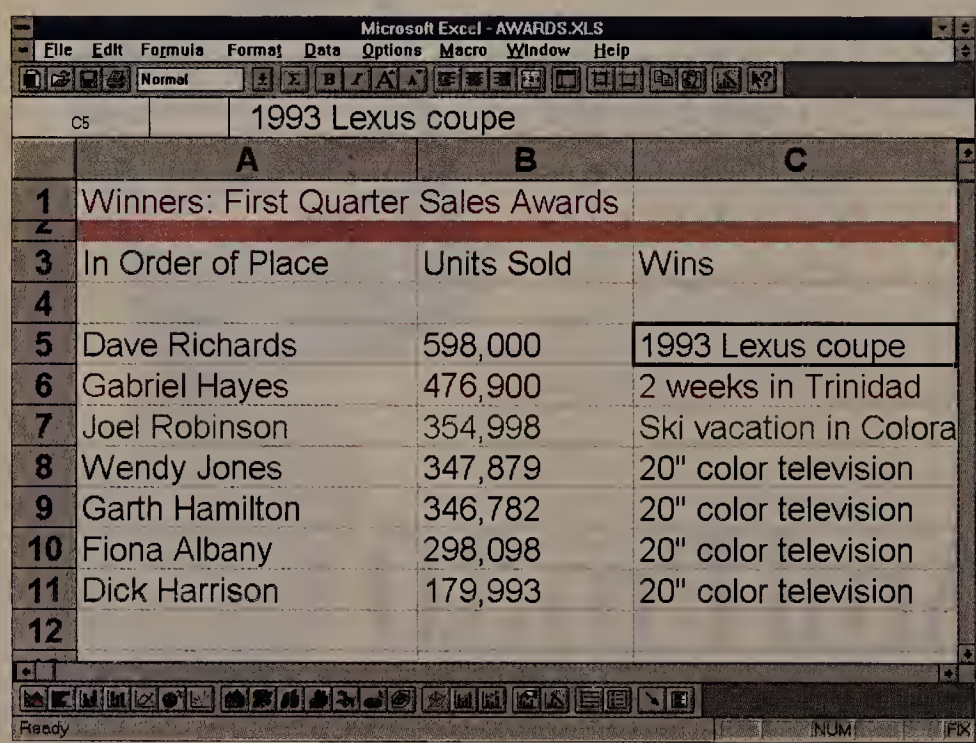
Wrong. Use the Changer add-in file to fix all name references when you change a range name. Select *File•Open* and locate the CHANGER.XLA file located in your EXCEL/LIBRARY directory. Click *OK* to attach the add-in. You'll see a new command—*Change Name*—in the *Formula* menu. This command opens a dialog box that lets you select an existing range name and provide a new one. If you change names often, make the command permanent by choosing *Options•Add-ins•Add* and specify the CHANGER.XLA file.

33

Fast Data Entry

Facing a heavy-duty data entry chore in *Excel?* The *Data•Form* command can make life easier—even if your worksheet isn't going to be used as a database. This is especially handy for data entered in rows, such as survey responses and monthly expenditures.

First, set up your column labels, which act as field names for each record; fill the first column with data that identifies each record; and select the entire range, including the titles. Choose *Data•Set Database* to define the input area as a database. Select *Data•Form*. This command displays a data entry dialog box that makes it easy to enter data. The first field contains the record identifier. Press <Tab> to move to the next field, the title of which is the second column's label. Enter the data and press <Tab> to progress to the next field. When you've completed a record, press <Enter> to move to the next. You can correct mistakes afterward by pressing



CHANGE THE DEFAULT FONT IN EXCEL in order to change the look of your usual worksheet completely.

<Shift>-<Tab> to move to the previous field or **<Shift>-<Enter>** to move to the previous record.

34

How Many, Not How Much

If you want to know how many times a value or string occurs in an *Excel* spreadsheet without performing calculations, use an array formula. Arrays can replace several single-value formulas and, in effect, let you do several things at once. Say you want to know how often Anne has checked a book out of the office library. If each checkout is recorded on a separate row, with name, book title, checkout date, and return date in columns from left to right, type **=SUM(IF(A3:A100 ="Anne",1))** in an out-of-the-way cell and then press **<Ctrl>-<Shift>-<Enter>** (if you accidentally press only **<Enter>**, press **<F2>** and then **<Ctrl>-<Shift>-<Enter>**). *Excel* puts braces ({}) around the entry to indicate an array formula. If Anne's name shows up 12 times in the column, '12' will appear in the array formula's cell.

35

Pulling Rank

Here's a simple formula that ranks data in a range. Say you want to rank semiconductor manufacturers by the volume of stock traded on a given day. For our example, we'll use a range named SHARES (D6:D15) in our figures. In B6, type **=SUM(IF(D6>= SHARES,1))** and press **<Ctrl>-<Shift>-<Enter>**. *Excel* recognizes the entry as an array formula and places curly braces around it. Copy the formula to D7:D15, and the ranks will be calculated. Change a number in column D and watch the ranking change.

36

Avoid Long Names

At first glance, the 31-character limit for file names in a workbook is a welcome release from the 8-character cage imposed by DOS. But use all 31 characters, and you may soon regret it. Every formula that references a cell in a workbook's file includes the workbook's name and the file's name. Not only do long references make your formulas difficult to understand and edit, they can easily break the 255-character limit for a cell. Stick with shorter names, and you'll save your neck.

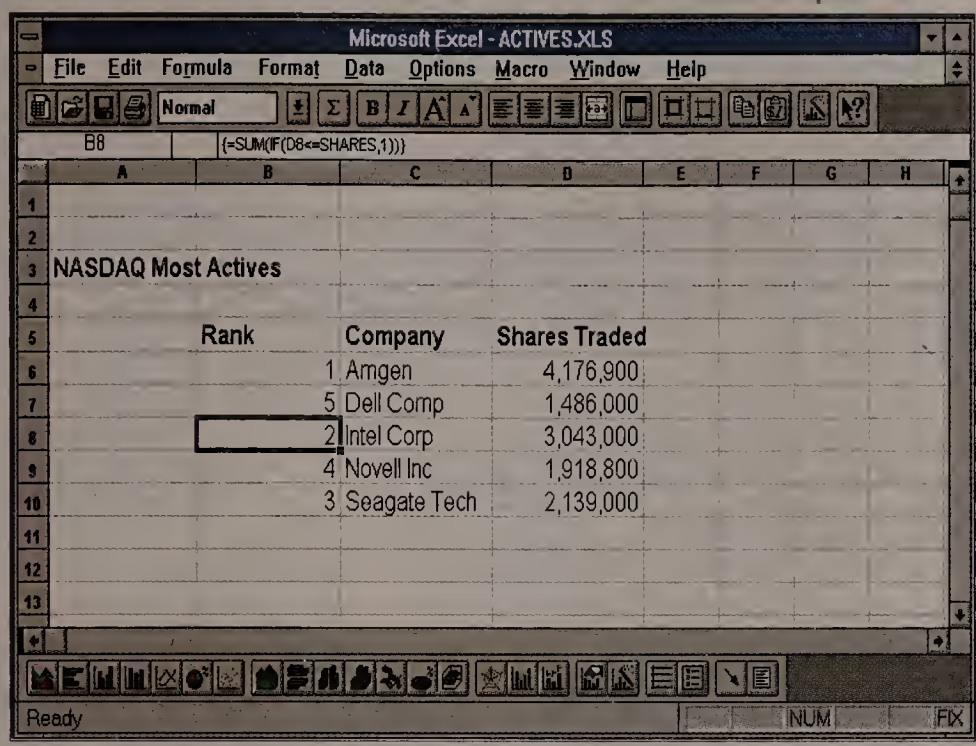
37

Free Your Chart of Zeros

Look at any annual report, and you'll find charts marked in millions or billions of dollars. Keep *Excel* charts free of unnecessary zeros with a custom number format that hides the last 3, 6, 9, or more digits. Use the format in your worksheets, and the charts you create from them will be much easier to read. Don't forget to annotate your chart with something like "dollars in thousands."

To create a custom numeric format, select the cells to be formatted and choose *Format•Number*. Press **<Tab>** to highlight the current entry in the Code text box and type the code that describes the format you want, replacing what appears in the box. For example, **#,##0,** removes three digits, so 100,000,000 appears as 100,000 and **#,##0,,** removes six digits, so 100,000,000 appears as 100 (each trailing comma in the code indicates three digits are to be dropped).

Custom numeric formats are stored with a worksheet. To reuse one, select *Format•Number*, click *All*, and your custom format appears in the Format Codes section. Double-click the custom format you want.



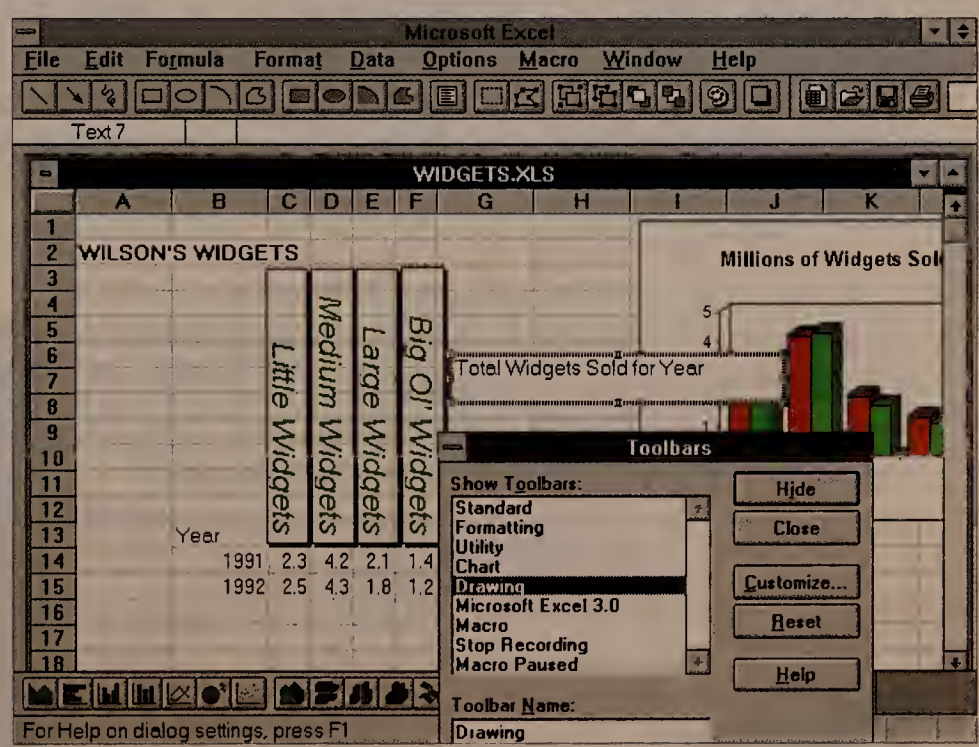
RANK INFORMATION AUTOMATICALLY with an array formula. Change the number of shares traded, and the rank changes.

38

Turn a Phrase

Excel lets you change the orientation of text or values in a cell with *Format•Alignment*. But vertical text automatically changes the row height to fit within the cell, leaving you with abnormally high rows. An alternative is to use *Excel*'s text tool to add a free-floating text box.

Open the Drawing tool bar by selecting *Options•Toolbars* and double clicking *Drawing* in the Show Toolbars list. Click the text tool icon (it looks like a page of text) and drag the mouse pointer in the worksheet to draw a box. Type your text into the box and right-click the box to evoke the shortcut menu. Select *Text* and click the desired orientation. Set the horizontal and vertical alignment and use the *Patterns* button to set border and fill options. Close



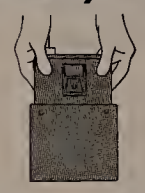
ROTATE TEXT OR VALUES IN A CELL with the Text tool on Excel's Drawing tool bar without altering row heights.

PRETTY EASY.

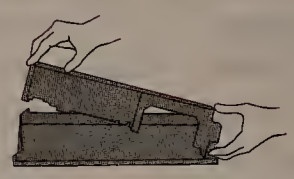
DELL 486/L SERIES

The Dell® 486/L has embedded diagnostics that can identify a problem component just by pushing the reset button twice. Even if a major component like the monitor or hard drive isn't working, a video display or beepcode will tell you the exact problem.

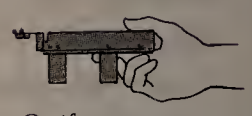
The Dell 486/L comes apart easily by first taking out two thumbscrews and removing the chassis cover. That's right, you don't need a hammer. Crowbar. Or a chainsaw.



Just push two buttons (you won't need an M.I.T. degree for this either), unplug two cables, and slide out your diskette drives for easy upgradeability or service. Or to add a tape drive or CD-ROM drive.



Then all you do is remove one tiny, little screw and pull out the entire card cage to add different user upgrade options like video memory. You can also add cache. Add Pentium™ technology. Change the processor. Or even swap out the system board. A child could do it. Or even your boss.



Or if you want to get to your hard drive for easy maintenance or for an upgrade, just take out another screw, unplug two cables, and snap it out.

If you need to remove a hard drive on a Compaq ProLinea System, it's not a pretty picture. And getting to the system board can be downright frightful.

Not so with the Dell 486/L series. In fact, it's the world's easiest PC to take apart. To remove the hard disk of any one of the L Series systems, take out one screw with a standard screwdriver. Access the Dell system board just by removing our unique expansion card cage, with network cables intact.

To remove our competitor's hard drive, take a crack at five screws with a

THE DELL 433/L
i486™ DX 33MHz SYSTEM

$1,899

BUSINESS LEASE◊: $70/MO.

• 4MB RAM • 170MB (17ms) HARD DRIVE • 3 ISA EXPANSION SLOTS • UPGRADEABLE TO PENTIUM TECHNOLOGY • ACCELERATED LOCAL BUS VIDEO WITH 1MB VIDEO RAM • SVGA 1024I MONITOR (14", 1024 x 768, .28mm) • ONE DISKETTE DRIVE (3.5" OR 5.25") • MS-DOS® 6.0

Many other L Series system configurations available.

intel inside

**Guarantees available in USA only for registered owners of Dell Performance Series systems purchased after 7/1/92. For a complete copy, please call our TechFax℠ line at 1-800-95 Group, Inc. ΔOn-site service provided by BancTec Service Corporation. On-site service may not be available in certain remote locations. The Intel Inside logo is a registered trademark and i486 an*

PRETTY UGLY.

COMPAQ PROLINEA

15 Torx screwdriver. (No, your local grocer probably on't have one.) And to access the system board, should ou decide to accept this mission, you may have to sconnect all of the cables, then remove the expansion ards, then replace the expansion cards, then reconnect all ie cables.

Dell also has embedded diagnostics that can run even hen the system won't boot. You'll never waste your time arching high and low for the diagnostic diskette that me in the box.

Another beautiful thing about Dell is the service guarantee* ensuring you on-site service by the next business day.Δ Which may be why we're the leader in customer satisfaction.

Why not order one right now? That's pretty easy, too.

DELL™

800-433-7831

WHEN CALLING, PLEASE REFERENCE **#11DBB**.
HOURS: 7AM-9PM CT MON-FRI, 8AM-4PM CT SAT, 10AM-3PM CT SUN.
IN CANADA: CALL 800-668-3021. IN MEXICO CITY: 228-7811.

*9 or write Dell USA L.P., 9505 Arboretum Blvd., Austin TX 78759-7299. Attention Guarantees. *Prices valid in U.S. only. Some products and promotions not available in Canada or Mexico. ΔLeasing arranged by Leasing tum are trademarks of Intel Corporation. MS-DOS is a registered trademark of Microsoft Corporation. Dell disclaims proprietary interest in the marks and names of others. ©1993 Dell Computer Corporation. All rights reserved.*

the dialog box and adjust the text position by dragging a side (not a handle) of the text box.

Quattro Pro for DOS

39

Add @Functions to Your Formula Bar

Avoid troublesome syntax errors and wasted keystrokes by pulling function statements from a list. **<Alt>-<F3>** brings up a scrollable list of @functions to select. Just highlight the function you want, press **<Enter>**, and it appears in the formula bar, ready to complete.

40

Stop Chasing Your Tail

Like an overexcited pup, *Quattro Pro* will chase its own computational tail if you create formulas that refer to each others' cells. For example, set cell B2 to equal the sum of cells B1 and B2, and you have a circular reference. While *Quattro Pro* helps you avoid meaningless calculations with a 'CIRC' warning at the bottom of the screen, what you really need is a way to know where the offending reference is. There is a way. In a blank cell, enter the formula **@CURVALUE("Audit" "Showcirc")**, and it will display the address of the circular reference.

41

Breaking Up Names

Why does it seem like data is never quite in the format you need? Say you have in column A a list of names (probably imported from a text file) that are in first name, last name format. Wouldn't it be more useful to have the first and last names in separate columns? Just plug in the formulas **@LEFT(A1,@IF(@ISERR(@FIND(" ",A1,@FIND(" ",A1,0)+1)),@FIND(" ",A1,0),@FIND(" ",A1,@FIND(" ",A1,0)+1)))** into B1 and **@RIGHT(A1,@LENGTH(A1)-@IF(@ISERR(@FIND(" ",A1,@FIND(" ",A1,0)+1)),@FIND(" ",A1,0),@FIND(" ",A1,@FIND(" ",A1,0)+1))-1)** into C1, then copy them down the length of your list. The first formula returns the first name, plus a middle name or initial (if present). The second formula returns the last name.

Want to sort by last name? In cell D1, enter **+C1&", "&B1**, copy it down the list, select *Database•Sort•Block*, specify A1 through the last name in column D and press **<Enter>**, select *1st Key*, specify D1 and press **<Enter>**, press **A** and **<Enter>**, and finally, select *Go*.

42

Down, Cursor!

For entering data in columns, a macro can make the <Enter> key move the pointer down after it enters your input. In cell A1, type **{?}{DOWN}{BRANCH A1}** and press **<Enter>**. The {?} waits for user input with the <Enter> key. {DOWN} moves the cell pointer down one cell. {BRANCH A1} makes the macro execution jump to cell A1, so the macro repeats itself (if you entered the macro in another cell, enter that cell name instead of A1).

Start the macro by selecting *Tools•Macro•Execute* while in the macro cell, and then press **<Enter>**. Now <Enter> moves the pointer down one cell after entering data. When you're finished, press **<Ctrl>-<Break>** to end the macro. <Enter> will now function normally.

43

Chartless Charting

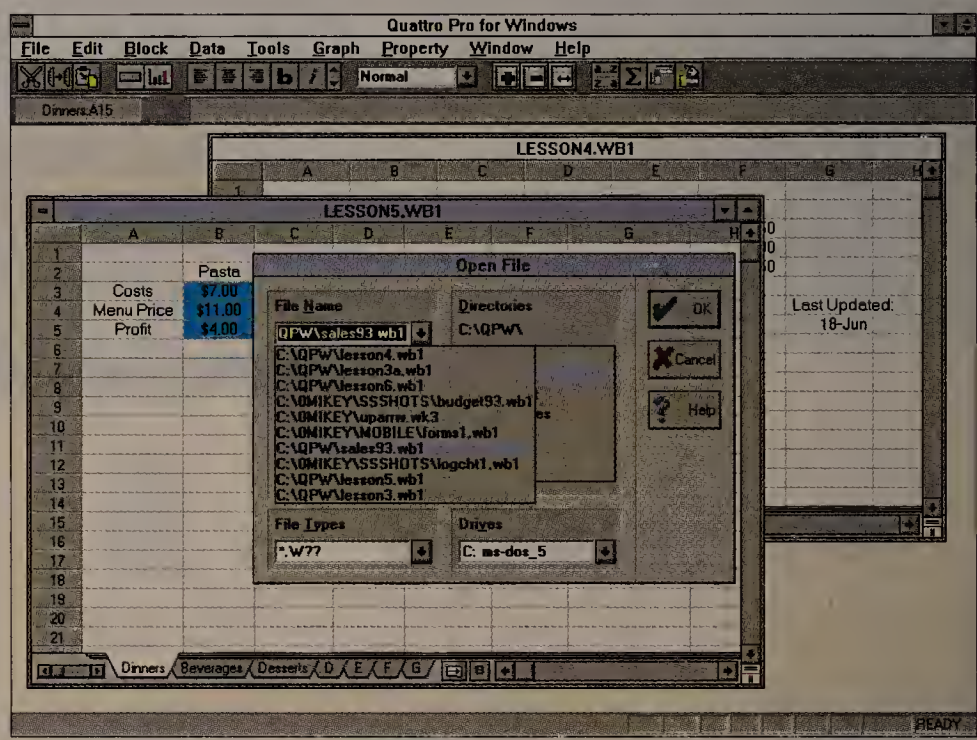
If you use a text-only printer, you can still turn spreadsheet numbers into a graph. Enter your items in the left column and your figures in the right (this works only with a one-series table). Select the value series and choose *Style•Numeric Format*, and select the +/- format. The numbers appear as + or – symbols; 4 becomes four plus signs, -3 becomes three minus signs. If you get a line of asterisks, you need to widen the column to fit the graph.

Quattro Pro for Windows

44

Hidden File List

The *File•Open* command in *Quattro Pro for Windows* lists the last ten files you opened. Click the down arrow on the right side of the File Name box or press the **<Down>** cursor key, and the list drops down. Click on the name of the file to open, and you're ready to work.



FIND A HIDDEN LIST OF the files that were opened most recently in Quattro Pro for Windows.

45

Name the Day

Want to know the day your birthday falls on this year? *Quattro Pro for Windows* obliges. To display the day of the week from a date, first select the cell or range where you will enter the date(s) and right-click on the selected area. A dialog box pops up with the Numeric Format category preselected; select User Defined at the bottom of the radio button list in the second panel. Press **<Tab><Down>** or click the down arrow in the third panel to open the Formats defined list. Choose *TWeekday* and click *OK*. Now when you enter a date into those cells, *Quattro Pro for Windows* displays the day of the week that date falls on.

46

Sweeping Changes

The three-dimensional notebook metaphor is a winner, but changing certain spreadsheet properties—for example, the grid line display—is tedious if you have to change it for each page separately. To make changes to the entire notebook, select *Tools•Define Group*. Type a name for the group of pages in the Group Name box. Type **A** in the First Page box and **IV** in the Last Page box. Turn on Group mode by clicking the G icon at the bottom of the screen—you'll see a blue line appear beneath all the page tabs and the G icon. Right-click any

page tab to bring up the property inspector dialog box, select *Grid Lines*, and uncheck the Vertical and Horizontal checkboxes that appear.

47

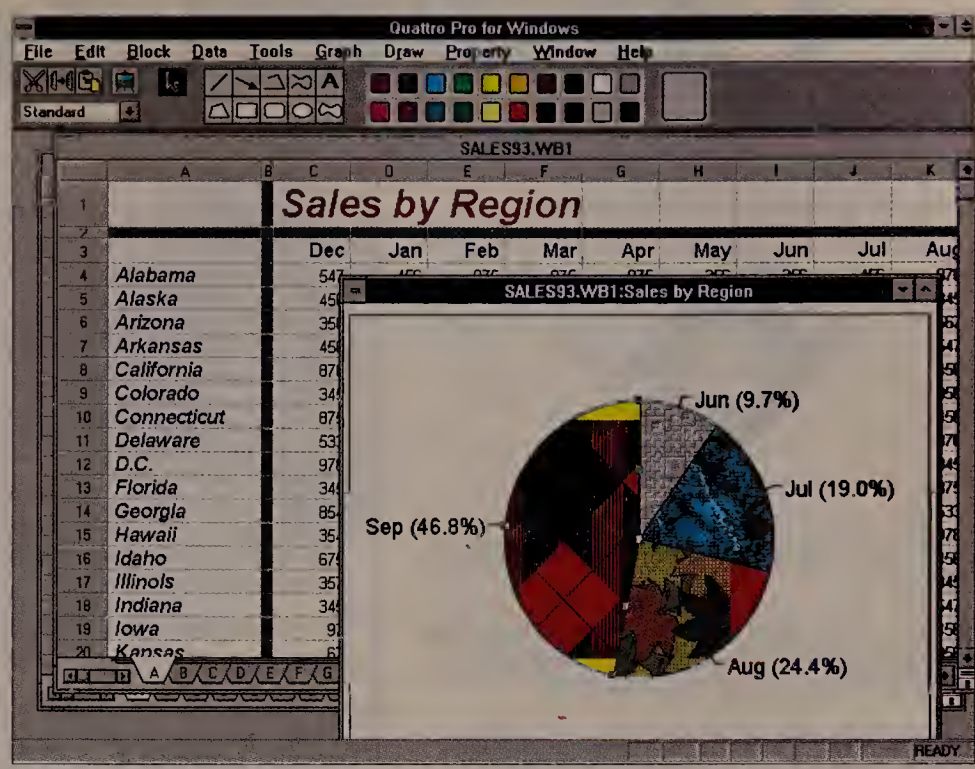
Instant Radio Buttons

Creating your own dialog boxes when building spreadsheet applications is a snap. And if you need plenty of radio buttons in your box, here's a way to make them fast. Select *Tools•UI Builder* to open a blank dialog box. From the SpeedBar, choose the Group Box tool icon (move the mouse pointer over the SpeedBar to find out what each icon does) and draw a box in the blank dialog box by dragging the mouse pointer. To fill this box with radio buttons, hold down the **<Ctrl>** key as you drag a handle to resize the box. The box fills with as many radio buttons as space allows. To delete some of the buttons, select the unneeded items (after picking the first one, you can hold down **<Shift>** as you select to pick more) and press **<Delete>**.

48

The Sound of Dialog in a Box

Want to make that custom dialog box sing—or rather, talk? To insert an OLE object—say, a brief verbal message warning users to save their files—select *Edit•Insert Object* and choose the program that created your object. The program will launch. Open the file you want to embed and close the program. When asked if you want to update the embedded object, click *Yes*. Then right-click the object, select *Object Name*, enter a name for the object, and click *OK*. When you build your custom dialog box with *Tools•UI Builder*, add a button and select *Dialog• Links*. Click the *Add* button to insert a link, and specify the link command **ON Clicked DOMACRO {SelectFloat** *message*} **{OLE.Play}**. Substitute the name of the object for *message*. The only hitch is that the message must be located on the active page of the notebook—otherwise the program will not find it.



USE ANY BIT MAP TO DRESS UP your charts in Quattro Pro for Windows.

49

A Picture Is Worth a Thousand Bars

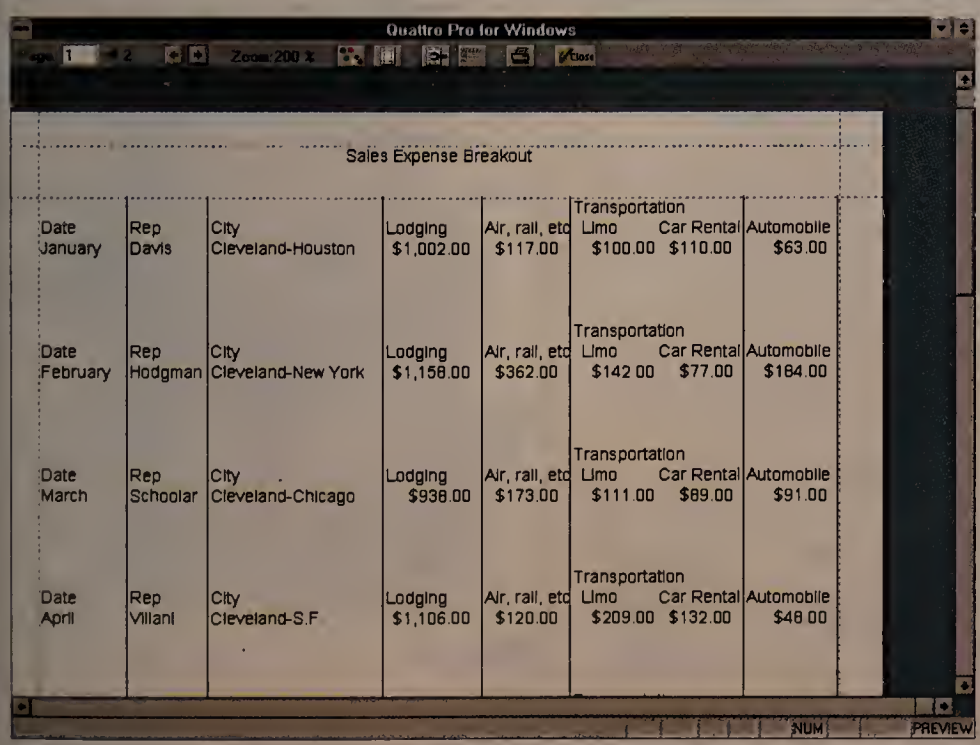
Charts can be boring. Fortunately, you can break out of old patterns by using graphic images as chart elements. Create your graph as usual and right-click on a bar, pie slice, or marker to bring up the property inspector. Click on *Fill Style*, check the Bitmap radio button, and then click *Browse* to select a bit map file to use. Click *OK* when you have selected the file you want, then click *OK* again in the Properties dialog box. The selected chart element will be filled with pattern in the bit map file you selected.

50

Print Portions of Multiple Pages

Say you have your monthly budget set up so that you have one month per page in a single *Quattro Pro for Windows* notebook. What if you want to print only what you spent each year on travel? If all the pages are set up the same way, it's easy.

Select the block of cells you want to print on the first page. Hold the **<Shift>** key and click on the tab for the last page you want to include. A black line will appear under all the page tabs. Select *File•Print Preview* to see all 12 ranges, one after another.



PRINT PORTIONS OF MULTIPLE PAGES on a single page.

The following people contributed to this article: Nicholas Delonas is a computer consultant with Gasteiger & Delonas in Allston, Massachusetts; Jim Desmond is a computer consultant in Chicago; Shane Devonshire is a computer consultant in Walnut Creek, California; Rick Dobson is a computer consultant and author in Louisville, Kentucky; Anne Ehrenshaft is a technical information analyst at Oak Ridge National Laboratory in Oak Ridge, Tennessee; Cynthia Fitzgerald is an associate editor for PC World Lotus Edition; *Elisabeth M. Hohne is an information services specialist for RISCorp of Florida; Wolf Kadavanich is president of the Southern California Quattro Pro Users Group; Donald E. Klamon is a San Francisco–based computer consultant specializing in spreadsheets; Stephen L. Nelson is a certified public accountant in Redmond, Washington, and the author of several computer books including* The Power of Improv; *Vincent O'Connor is a computer consultant in Babbit, Minnesota; John Walkenbach is a contributing editor for* PC World.

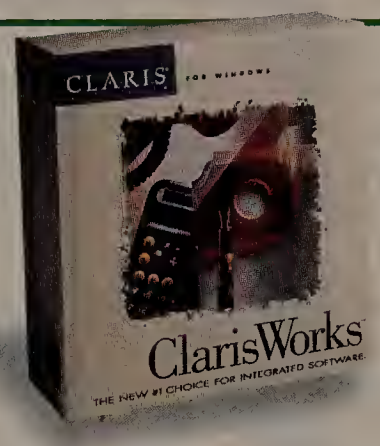
Custom Compaqs

1990, 1991 and 1992 World Class Awards
for Best Mail-Order Company

All software is not copy-protected, unless indicated otherwise by *(CP)*.

The four- or five-digit number next to each product is the product's ITEM NUMBER. Please refer to this number when ordering. Thank you.

We carry only the latest versions of products. Version numbers are current at press time. Products listed here in red are Microsoft Windows Applications.



NEW INTRO PRICE, ONLY $95!

PROMO PRICE, ONLY $119!

Claris Corporation

10996 *ClarisWorks for Windows*—The new choice for Windows integrated software, has full-featured word processing, database, spreadsheet, charting, & graphics capabilities seamlessly integrated to work together. **$95.**

5257 *FileMaker Pro for Windows*—Winner of *PC Magazine*'s Editors' Choice Award. This database offers easy access to powerful and sophisticated features without complicated programming commands ..... **$119.**

5228 *FileMaker Pro Competitive Upgrd.* .. **89.**

COMPUTERS

Compaq Computer ... 3 years

11588 ProLinea 4/33 with 240 MB, Windows, Local Bus ..... *while supplies last* $1759.
10893 ProLinea 4/50 with 240 MB, Windows..... *while supplies last* 1699.
11590 LTE Lite/25E with 120 MB, Windows ..... 2999.
9552 Contura 3/25 with 120 MB, Windows ..... 1599.
11453 Deskpro 4/25is with 120 MB, Windows ..... 1499.

BUSINESS APPLICATIONS

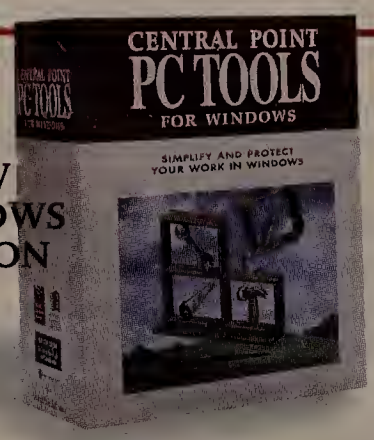
Approach Software
3830 Approach 2.0 for Windows Competitive Upgrade 95.
Automap
2729 Automap USA for DOS.. 55. 8569 Windows.. 55.
Banner Blue Software
2088 Org Plus 2.0 for Windows ..... 125.
Borland International
10616 Quattro Pro Win.*(3½" only)* .. *while supplies last* 95.
10710 Paradox Windows *(3½" only) while supplies last* 129.
11445 Paradox/Quattro Pro for Windows Bundle ..... 189.
Caere
8933 OmniPage Pro 2.1 ..... 629.
Claris Corporation
10996 ClarisWorks Win. 95. 5257 FileMaker Pro Win. 119.
5228 FileMaker Pro for Windows Competitive Upgrade.. 89.
Concentric Data Systems
6575 R&R Report Writer DOS 159. 9236 Windows. 159.
Contact Software
7435 ACT! for Windows ..... 239.
Intuit
2426 Quicken 5.0..... 45. 5596 for Windows ..... 45.
Lotus
5653 1-2-3 2.4 *(5652 3½")* ..... 335.
5417 1-2-3 3.4 *(5416 3½")* ..... 399.
2755 1-2-3 4.0 for Windows *(2756 3½")* ..... 309.
3424 1-2-3 4.0 for Windows Upgrade *(3428 3½")* ... 99.
5799 Ami Pro 3.0 ..... 239.
1847 Ami Pro 3.0 Competitive Upgrade ..... 99.
10753 Improv for Windows *(3½" only)* ..... *intro. price* 99.
1493 Organizer for Windows ..... 99.
5981 SmartSuite *(5982 3½")* ..... 469.
MECA
2798 Managing Your Money 9.0 ..... 32.
Microsoft
2735 Works 2.0 for Windows ..... 129.
6195 Word 2.0 for Windows *(7811 3½")* ..... 299.
3881 Word for Windows 2.0C Comp. Upgrd. *(7841 3½")* 125.
2856 Excel 4.0 for Windows *(5680 3½")* ..... 299.
5693 Excel 4.0 Competitive Upgrade *(5695 3½")* .... 125.
8355 Access 1.0 for Windows *(8326 3½")* ..... call
10056 FoxPro 2.5 for Windows *(10057 3½")* ..... 299.
7388 Project 3.0 for Windows *(11367 3½")* ..... 445.
8137 Office 3.0 for Windows *(8138 3½")* ..... 449.
Nolo Press
2982 WillMaker 4.0 ..... 35.
Peachtree
5757 Accounting 5.0 for Windows ..... 79.
Polaris Software
4395 PackRat 5.0 ..... 249.
Reality Technologies
6572 WealthBuilder 3.0 *(incl. Smart Investor) (3½" only)* 94.
TIMESLIPS
5698 Timeslips Release 5 1.0 ..... 189.
WordPerfect Corporation
4396 Grammatik 5..... 55. 7483 for Windows..... 55.
7582 Presentations 2.0 ..... 279.
3804 WordPerfect *(3795 3½")* ..... 279.
3494 WordPerfect 5.2 for Windows *(3497 3½")* ..... 279.
4786 WordPerfect for Windows Ver. Upgrd. *(4795 3½")* 79.

GRAPHICS & DESIGN

Adobe Systems
10774 Adobe Photoshop 2.5 for Windows *(3½" only)* . 548.
6591 Adobe Illustrator 4.0 for Windows *(6439 3½")*. 389.
7940 Adobe Type Set Value Pack *(7941 3½")* ..... 39.
(Entire Adobe Type Library available)
AGFA
10396 Discovery TrueType Pack ..... 49.
Aldus
11033 FreeHand Windows Comp. Upgrd. *(11034 3½")* 145.
11036 PhotoStyler Win. Comp. Upgrd. *(11037 3½")*.. 189.
11667 PageMaker 5.0 for Windows *(3½" only) (June)* 579.
Altsys Corporation
8675 Fontographer for Windows 3.5 *(3½" only)* ..... 259.
Application Techniques
1214 Pizazz Plus 3.0 ..... 79.
Ares Software
6030 FontMonger 1.0.7 for Windows ..... 89.
Bitstream
8040 FaceLift 2.0 for WordPerfect 5.0/5.1 *(3½" only)*. 69.
2089 MakeUp 1.1 for Windows ..... 79.
Corel Systems
5506 CorelDRAW! 3.0 *(5508 3½")* ..... 395.
DeltaPoint
5172 FreezeFrame 1.0 for Windows ..... 62.
Fractal Design
7822 Sketcher 1.0 for Windows ..... 94.
Inset Systems
7298 HiJaak 2.1.. 115. 3820 1.0 for Windows ... 115.
LaserTools
9510 PrimeType 2.0 for WordPerfect ..... 62.
Lotus
3523 Freelance Graphics 2.0 for Windows *(5005 3½")* 349.
Micrografx
3627 Windows Draw! 3.0 *(3628 3½")* ..... 99.
MicroLogic Software
5350 TrueType 1.0 for DOS 49. 8579 MoreFonts 3.0 75.
Microsoft
10051 Font Pack 2 for Windows ..... 45.
3337 Publisher 1.0 for Windows ..... 129.
7387 PowerPoint 3.0 for Windows *(8423 3½")* ..... 299.
Shapeware
5426 Visio 1.0 for Windows *(3½" only)* ..... 199.
Software Publishing
4403 Harvard Graphics for Windows *(4402 3½")* ..... 369.

SYSTEM UTILITIES & PROGRAMMING

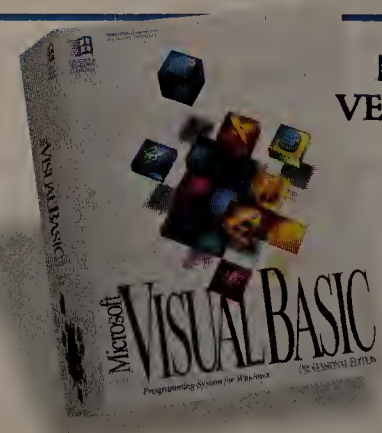
AddStor
8807 SuperStor Pro 1.0 ..... 85.
Avery Dennison
6006 Label Pro 1.6 *(Laser)* ..... 49.
Baler Software Corporation
11312 Baler 6.0..... 279. 11314 Baler Express ..... 95.
Berkeley Systems
9885 After Dark 2.0 for Windows ..... 29.
6649 Star Trek: The Screen Saver *(3½" only)* ..... 34.
Central Point Software
9751 Anti-Virus 1.4 *(9555 3.5")* or 8114 Backup 7.1 *ea.* 89.
5039 PC Tools 8.0 *(1475 3½")* ..... 125.
11394 PC Tools for Windows *(11395 3½")* ..... 125.
Fifth Generation Systems
7725 Direct Access 5.1.6 ..... 64.
3950 Fastback Plus.... 95. 6431 for Windows.... 95.
Gibson Research
9832 SpinRite 3.1 ..... 85.
Hewlett-Packard
8731 Dashboard 1.0 for Windows ..... 45.



NEW WINDOWS VERSION

Central Point Software

11394 *PC Tools for Windows*—The long awaited PC Tools for Windows incl.: a new Desktop, File Manager, Desktop Accessories, Backup, Anti-Virus, Data & Disk Recovery, & an Event Scheduler *(11395 3½")*.. **$125.**



NEW VERSION

Microsoft

1624 *Visual Basic 3.0 for Windows Standard Ed.*—Fast object oriented programming language & access to data make this the most productive way to go from idea to application..... **$129.**

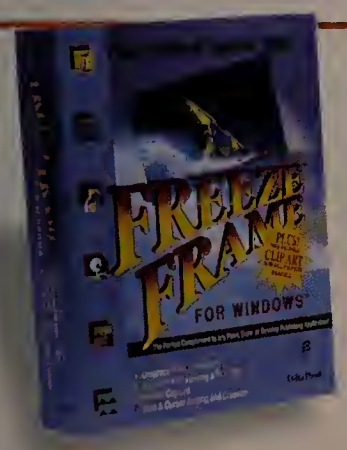
5601 *Visual Basic 3.0 Professional Edition*... **299.**

ship overnight?

LaserTools
6882 PrintCache 3.1 ..... $49.
Microsoft
11324 MS-DOS 6 Upgrd. *(11325 3½") while supplies last* 39.
7010 Windows 3.1 *(7009 3½")* ..... 89.
1624 Visual Basic 3.0 Windows Std. Ed. *(10154 3½")* 129.
5601 Visual Basic 3.0 Windows Pro. Ed. *(10437 3½")* 299.
11444 Visual C++ Standard Edition *(3½" only)* ..... 129.
PC-Kwik
8565 WinMaster 1.5 *(8566 3½")* ..... 65.
4925 PC-Kwik Power Pak 3.0 w/Power Disk *(8004 3½")* 79.
Personics
9288 Laptop UltraVision 2.1 *(3½" only)* ..... 59.
Qualitas
7539 386MAX 6.02 ..... 59.
Quarterdeck
3221 Expanded Memory Manager 386 6.0 *(3217 3½")* 59.
4586 DESQview 386 2.4 *(4585 3½")* ..... 129.
Stac Electronics
1409 Stacker 3.1 ..... 95.
Symantec
6397 The Norton Backup 2.2 for DOS *(2356 3½")* ..... 99.
2359 The Norton Desktop 2.2 for Windows *(2360 3½")* 115.
3146 The Norton Utilities 7.0 *(5136 3½")* ..... 115.
8378 Norton pcANYWHERE 4.5 *(8535 3½")* ..... 119.
11304 pcANYWHERE 1.0 for Windows *(11303 3½")* .. 129.
Touchstone Software
11665 Check It Pro Set 1.0 ..... 79.
XTree
8328 XTree 1.5 for Windows *(8957 3½")* ..... 65.
6161 XTree Gold 2.5 ..... 95.

NETWORKING/COMMUNICATIONS

3 Com ... lifetime (conditional)
3453 EtherLink II/16..... 159. 3469 II/16 TP ..... 169.
Artisoft
2455 Lantastic AE-2 EtherNet Starter Kit 4.1 ..... 469.
2452 AE-2 EtherNet Adapter Card ..... 199.
Caere
4130 FaxMaster 1.0 ..... 95.
Cardinal ... lifetime
8690 MVP24I Modem Value Pack ..... 39.
7667 MVP96IF FaxModem Value Pack ..... 195.
CompuServe
10957 Windows Membership Kit 1.0 ..... 27.
Data Storm
4798 PROCOMM PLUS 2.01 69. 6918 for Windows 99.
DCA/Crosstalk
5611 Crosstalk 2.0 for Windows ..... 119.
Delrina Technology
5974 DOSFax PRO 49. 2446 WinFax PRO 3.0 79.
10454 Windows Communications PAK ..... 145.
Hayes ... 2 years
9039 Accura 2400 *(ext.)*.... 69. 9033 *(internal)*..... 59.
7391 ULTRA 96 Modem.. 599. 5024 ULTRA 144 . 669.
1345 OPTIMA 24 Modem 115. 3522 OPTIMA 96 . 349.
8187 OPTIMA 24+FAX96 ..... 119.
7395 OPTIMA 144+FAX144 ..... 389.



DeltaPoint
5172 *FreezeFrame 1.0 for Windows*—The "Must Have" graphics utility. Convert files, view and print, and screen capture. Also includes an icon editor/creator, 300 hi-res clip-art and wallpaper images..... **$62.**

SPECIAL BUNDLE OFFER!

Zoom Telephonics/Delrina Technology
4429 *FaxModem VFP V.32bis Internal*—Send & receive class one or two faxes at 14,400 bps. Both FaxModems provide V.42bis compression & MNP 2-5 error correction for up to 57,600 bps..... **$192.**
4428 *FaxModem VFX V.32bis External*. **215.**
2446 *WinFax PRO 3.0*—Makes it easy to send, receive & manage faxes from within Windows. Send faxes as easily as you print documents!..... **79.**
Combined they satisfy your total fax needs.
11649 *WinFax PRO & FaxModem VFP V.32bis Internal*..... **249.**
11632 *WinFax PRO & FaxModem VFX V.32bis External*..... **269.**

Intel ... 3 years
10436 SatisFAXtion Modem/300 ..... 239.
5994 Modem/400..... 399. 5995 Modem/400e ..... 399.
2994 EtherExpress 16 or 3021 16 TP ..... ea. 129.
Megahertz ... 5 years
10514 P2144 14.4 Pocket Fax/Modem ..... 379.
10515 C5144 14.4 Fax/Modem *(Compaq LTE/Contura)* 499.
Microcom
6234 CarbonCopy Plus 6.1 129. 4410 Windows 129.
Microsoft
6141 Windows for Workgroups Add-on *(6172 3½")*... 59.
Norton-Lambert
2753 Close-Up Dual Pack 4.0 *(2754 3½")* ..... 125.
Practical Peripherals ... lifetime
3803 PM14400FX *(internal modem/fax)* ..... 199.
9234 PM14400FXPPM Pocket Fax/Modem ..... 359.
10570 PM14400FXMT *(external modem/fax)* ..... 215.
Prometheus ... 5 years
6444 Ultima Home Office *(internal)* ..... 289.
Sofnet
5883 FaxWorks 2.5 *(Windows & DOS) (3½" only)* ..... 45.
Supra ... 5 years
11441 SupraFaxModem V.32bis Ext. for DOS ..... 299.
11442 SupraFaxModem V.32bis Ext. for Windows ..... 299.
Technology Concepts ... 2 years
6315 Fax Line Manager 203 ..... 125.
TheComplete PC ... 2 years
8593 TheComplete Communicator Gold ..... 389.
Traveling Software
4407 LapLink V ..... 99.
Zoom Telephonics ... 7 years
1494 Ext. 9600V.32..... 195. 3075 Internal..... 179.
4430 FaxModem AFX *(2400 baud 96S/48R)* ..... 69.
4429 FaxModem VFP V.32bis 14,400 baud *(internal)* 192.
4428 FaxModem VFX V.32bis 14,400 baud *(external)* 215.
7921 Pocket FaxModem ..... 87.

VIDEO & SOUND

ATi Technologies ... 5 years
8463 VGA Wonder XL24 149. 2012 Graphics Ultra 209.
3886 Graphics Ultra + *(with 2 MB)* ..... 339.
3871 Graphics Ultra Pro *(with 2 MB)* ..... 519.
Boca Research ... 5 years
10468 SVGAX3 *(with Bit BCT acceleration)* ..... 149.
8380 BasicVGA..... 49. 8381 SuperVGA ..... 115.
Creative Labs ... 1 year
5770 Sound Blaster 16 ..... 229.
10906 VideoSpigot for Windows ..... 429.
Diamond Computer ... 5 years
11461 SpeedStar Pro..... 125. 10079 Stealth 24 .. 165.
11306 Stealth Pro 1 MB.... 249. 11305 2 MB..... 339.
Hauppauge Computer ... 1 year
10593 Win/TV, Microsoft Video for Windows Bundle.. 459.
Intel ... 3 years
11587 Smart Video Recorder ..... 499.
KOSS Corporation ... 90 day
11323 HD-4 speakers *(with equalizer & AC Adaptor)*... 55.
MediaVision ... 1 year
5637 ProAudio Spectrum 16 *(3 yr.)* ..... 199.
11478 ProMovie Spectrum 299. 10735 CDPCXL 1099.
NEC ... 2 years
4252 MultiSync 3FGX Monitor *(14")* ..... 689.
4249 4FG Monitor *(15")*.... 799. 3151 5FG *(17")* 1449.
Video Seven ... 7 years
7362 WIN.VGA 1 MB 129. 9261 WIN.PRO 1 MB 179.

INPUT/OUTPUT

Caere ... 1 year
8158 Typist Plus Graphics ..... 299.
Canon ... 1 year
We are an authorized Canon Service Center.
7809 BJ-200 BubbleJet Printer ..... 355.
9037 BJ-300..... 469. 9038 BJ-330 ..... 529.
CoStar ... 1 year
10300 Address Express ..... 689.
Epson ... 2 years
11495 Stylus 800 *(1 year warranty)* ..... 379.
5555 AP-3250 *(80 col., 200 cps, 24 pin)* ..... 199.

Supra ... 5 years
SupraFaxModem V.32bis—Features 14,400 bps fax and data. Comes with choice of DOS or Windows software. External includes cable.
DOS: 11440 *Int.* **$219.** 11441 *Ext.* **$299.**
Windows: 11443 *Int.* **219.** 11442 *Ext.* **299.**

800-800-0003

PC Connection **693PCW**
6 Mill Street
Marlow, NH 03456
SALES 603-446-0003 **FAX** 603-446-7791

PC CONNECTION®

© COPYRIGHT PC CONNECTION, INC., 1993 PC CONNECTION, PCTV AND THE RACCOON CHARACTER(S) ARE REGISTERED TRADEMARKS OF PC CONNECTION, INC., MARLOW, NH. ALL OTHER TRADEMARKS REMAIN THE PROPERTY OF THEIR RESPECTIVE COMPANIES.

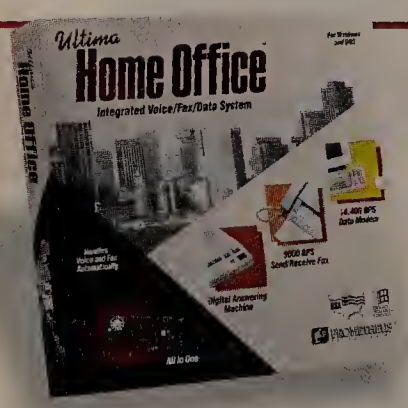
No way. Way! $5.

Microtek ... 1 year
5187 *ScanMaker II*—The ScanMaker II and the superfast ScanMaker IIxe offer affordable ways to capture 24-bit color or 8-bit gray-scale images at up to 1200 dpi..... **$879.**
5175 *ScanMaker IIxe with PhotoStyler*..... **1099.**

2358 LQ-570 *(80 col., 252 cps)*..... 249.
10784 Action Laser 1500 *(1 MB)*..... 889.
10752 ES600C Color Scanner *(requires interface kit)*. 895.
Hewlett-Packard ... 1 year
7621 DeskJet Portable..... 439.
6442 LaserJet 4 *(with toner)*..... 1499.
Kensington Microware ... 1 year
7899 Expert Mouse *serial*... 99. 7900 *bus*..... 115.
Key Tronic ... 3 years
4518 101 Plus Keyboard..... 99.
4387 Trak 101 Keyboard *(with trackball)*..... 165.
Logitech ... limited lifetime
3996 Trackman2 *(combo)*... 79. 2343 Portable.... 99.
3295 Mouseman *(combo)*.... 69. 9766 *(cordless)*.... 89.
Microsoft ... lifetime
7597 Microsoft Mouse *(bus or serial)*..... 85.
1896 Ballpoint Mouse *(serial only)*..... 119.
2898 Mouse with Windows 3.0 *(bus or serial)*..... 149.
MicroSpeed ... 1 year
6007 PC-TRAC Trackball *serial*..... 75.
Microtek ... 1 year
5187 ScanMaker II 879. 5175 ScanMaker IIxe. 1099.
Mouse Systems ... lifetime
7878 PC Mouse III *(serial)*.. 69. 5427 NewMouse .. 62.
Mustek ... 1 year
8452 Gray Artist for Windows *(256 GS hand scanner)* 165.
Okidata ... 1 year
5093 OL400 Laser Printer..... 649.
9590 OL810 Laser Printer..... 1089.
Pacific Data ... lifetime/60 day MBG
5729 ProTracer *(personal CAD printer) (1 yr.)*..... 1099.

ACCESSORIES

American Power ... 2 years
7108 Smart UPS 400.... 339. 7105 Smart 600.... 439.
3819 Back-UPS 250..... 115. 3858 Back 400..... 179.
7107 Back-UPS 450..... 215. 3823 Back 600..... 295.



Prometheus ... 5 years
6444 *Ultima Home Office*—Internal, integrated communications system. 14,400 modem, send/receive fax and digital voice messaging, featuring MaxFax voice/fax software... **$289.**
7776 *Home Office Modem (internal)*..... **179.**

Curtis ... lifetime
7358 Command Center SPF-4..... $79.
Cyrix Corporation ... 5 years
9875 FasMath 83D87-25 or 9876 83D87-33..... ea. 89.
Intel ... 3 years
4750 80387SX..... 79. 5409 80387DX..... 85.
I/O Designs ... lifetime
8121 Ultimate Laptop SL 52. 8113 Ultimate Laptop EX 59.
11371 Ultimate Laptop XL Carry Case..... 65.
Kensington Microware ... 1 year
Full line available. Partial listing.
2582 MasterPiece Plus..... 95. 2587 Remote..... 105.
10748 MasterPiece Compact..... 59.
10410 NoteBook Traveler PC Deluxe Case..... 75.
PC Power & Cooling ... 2 years
9537 CPU Cooler *(for 386/33 up to 486)*..... 29.
3203 Turbo Cool 200 149. 7915 Turbo Cool 300 159.
Targus ... lifetime
1305 Universal Notebook Computer Case..... 69.
11207 Leather Notebook Computer Case..... 89.
Tripp Lite ... 2 years
6199 Isobar 4-6 *(4 outlets, Gold Seal Warranty)*..... 49.
6200 Isobar 6-6 *(6 outlets, Gold Seal Warranty)*..... 59.
9312 BC500 Power Backup..... 219.

DRIVES

Colorado Memory Systems ... 1 year
4354 Jumbo 250 Tape Backup..... 215.
1073 Trakker 250 Tape Backup *(parallel)*..... 429.
Conner Peripherals ... 1 year
2339 CP30104H 120 MB IDE HD *(19 ms)*..... 269.
1337 CP30204 210 MB IDE HD *(16 ms)*..... 349.

WordPerfect Corporation
WordPerfect 5.2 for Windows—Ships with *Grammatik 5, ATM,* & twelve new fonts.
6228 *WordPerfect Competitive Upgrade*.. **$99.**
4786 *WordPerfect Version Upgrade*..... **79.**
3494 *WordPerfect 5.2 for Windows*..... **279.**

IOMEGA ... 1 year
6499 Transportable 90 PRO..... 659.
10452 Transportable MultiDisk 150..... 849.
6344 PC Powered 90 PRO *(includes PC2B, cartridge & Central Point Software)*..... 599.
10537 PC Powered 150..... 799.
10457 Dual MultiDisk 150..... 1699.
2530 90 MB Cartridge..... 149. 2467 Tripak..... 439.
8480 Tape250 Insider Tape Backup..... 199.
8481 Tape250 Inside Half-Height Tape Backup..... 209.
10702 Tape250 Parallel Port Tape Backup..... 429.
8482 Tape250 PC Powered Tape Backup..... 319.
NEC ... 2 years
6582 CDR74-1 Portable CD-ROM Drive..... 629.
6581 CDR84 Internal CD-ROM *(reqs. interface)*..... 569.
Quantum ... 2 years
8287 Plus Hardcard II XL 105 MB *(9 ms)*..... 279.
4735 Hardcard EZ 127 MB IDE *(17 ms)*..... 329.
4714 Hardcard EZ 240 MB IDE *(16 ms)*..... 549.
TEAC ... 1 year
6951 1.2 MB Drive for AT..... 59.
4670 1.44 MB Drive *(3½")*..... 55.
4326 1.44 MB Drive *(3½", with Bastech)*..... 75.
4414 3½"/5¼" Dual Floppy Drive..... 145.

MEMORY

1411 1 MB x 9 SIMMs *(70 nanosecond)*..... call
2497 4 MB x 9 SIMMs *(80 nanosecond)*..... call
5746 1 MB Chips *(80 nanosecond, set of 9)*..... call
Boca Research ... 5 years
7150 BOCARAM/AT PLUS *(2 MB)*..... 169.
7139 *(4 MB)*..... 239. 7138 *(8 MB)*..... 449.
6998 I/O Board for AT.. 49. 6999 for PS/2..... 89.

$784 FREE SOFTWARE VALUE!

Intel ... 3 years
11587 *Smart Video Recorder*—Power and performance! Fifteen times faster for one-step capture and compression of 1/4 screen video onto one-fifth the hard disk space..... **$499.**

Intel ... 3 years
1086 Matched Memory Classic Memory Board ØK.... 95.
8479 Above Board ISA ØK..... 179.
Pacific Data ... lifetime/60 day MBG
Memory upgrade for LJ IIP, III, IIID, IIIP:
7055 2 MB..... 119. 7759 4 MB..... 199.
7959 4 MB Upgrade for LaserJet 4..... 165.

DISKS/MEDIA

Fuji ... lifetime
2214 3½" DS Disks *(10)*..... 9. 2242 *(50)*..... 32.
7379 3½" HD Disks *(11)*..... 13. 2241 *(50)*..... 59.
4863 3½" HD Disks *(20)* with storage case..... 25.
Sony ... lifetime
3292 5¼" HD Disks *(10)*..... 11.
3297 3½" DS Disks *(10)*..... 9. 6148 *(30)*..... 25.
3298 3½" HD Disks *(10)*.... 14. 6375 *(30)*..... 39.
8185 QD2040..... 14. 1895 QD2120..... 19.
3M ... lifetime
1581 DC2120..... 22. 11013 *(3 pack)*..... 60.
Toshiba ... lifetime
4858 3½" 2.88 MB ED Disks *(5)*... 17. 9755 *(10)*... 29.

OUR POLICY

- We accept VISA and MASTERCARD.
- No surcharge added for credit card orders.
- Your card is not charged until we ship.
- If we must ship a partial order, we never charge freight on the shipment(s) that complete the order (in the U.S.).
- No sales tax, except Ohio residents (please add applicable tax).
- All U.S. shipments insured; no additional charge.
- APO/FPO orders shipped 1st Class Mail.
- International orders U.S. $100 minimum. Manufacturer support and upgrade eligibility may be limited outside the U.S.A.
- Upon receipt and approval, personal and company checks clear the same day for immediate shipment of your order.
- Corporate P.O.s accepted subject to approval.
- COD max. $1000. Cash or cashier's check. COD orders require an additional $4.50 charge. COD orders ship via UPS and may require additional UPS charges.
- 120 day limited warranty on all products. Defective software replaced immediately. Defective hardware repaired or replaced at our discretion. All items subject to availability. Prices and promotions subject to change without notice (e.g. SIMMs).
- Order lines opened continuously from 8 a.m. Monday until 5 p.m. Sunday ET. Business offices at 603-446-3383 Monday through Friday 9 a.m. to 5:30 p.m. ET.

SHIPPING

Continental U.S.: The total freight charge on any order placed with PC Connection is only $5. Barring events beyond our control, all credit card orders (no COD orders) phoned in weekdays by 3 a.m. ET will ship Airborne Express for delivery the next business day. Which means *same day* delivery for orders placed between midnight and 3 a.m. ET. (Some orders may ship by UPS Ground for next day delivery). Saturday delivery available to many areas upon request at no additional charge. Order all day Saturday through noon on Sunday for Monday delivery. (Some areas require an additional day delivery).
Hawaii, Alaska, Canada, Puerto Rico and the U.S. Virgin Islands: Shipping to these areas may require additional time and charges. Call 800-800-0003 for information.
All other areas: Please call 603-446-0003 or FAX 603-446-7791 for information.

SINCE 1982

PC CONNECTION

YOUR SOURCE FOR PC SOFTWARE AND PERIPHERALS.

MARLOW, NEW HAMPSHIRE

W E H A V E

COMPAQ

3 YEAR WARRANTY

NO FOOLIN'!

FAST SHIPPING

AND WAIT 'TIL YOU SEE THE PRICES!

©COPYRIGHT 1993 PC CONNECTION, INC. PC CONNECTION, EVERYTHING OVERNIGHT, AND THE RACCOON CHARACTER(S) ARE REGISTERED TRADEMARKS OF PC CONNECTION, INC. MARLOW, NH.

Shopping For PCs Just

The most reliable computers. The most reliable sourc

Since 1982, **PC Connection** has been setting the standards for computer mail-order from the village of Marlow, NH (pop. 0.0006 million). Since 1983, **Compaq** has been setting the standards for PC-compatibles from the city of Houston (pop. 1.6 million). It's an unbeatable combination.

Besides the prices (real low), and the shipping (real fast), and the service (real complete), and the

PC CONNECTION COMPAQ HOTLINE 800-998-0003

Low Prices. Delivered.

Some companies lead with a low price and then they hammer you on freight. But we charge $5 *total* for overnight delivery for your entire order. So when comparing prices, always check the *delivered* price. Then call us!

3-Year Warranty.

Check the warranties on other computers. No matter how deep you dig into the fine print you probably won't get past 1 year. The warranty on our Compaq computers is a full 3 years. *And the first year of service is on site.*

CUSTOMIZING?

Order by 10 p.m. ET and we'll *still* ship OVERNIGHT FOR $5. Pre-installed, pre-tested, and READY TO RUN. NO FOOLIN'!

©1993 PC Connection, Inc. PC Connection, Everything Overnight, and the raccoon character(s) are registered trademarks of PC Connection, Inc. Marlow, NH. All other trademarks remain the property of their respective companies.

Got Easier.

Ready to run. Overnight.

support (unreal), we can offer you something no one else can: two companies that have been in this business from the beginning and will be standing behind that new computer of yours for years to come.

OVERNIGHT SHIPPING $5.

Pre-Installed Hardware.

urchase any of the following internal components to customize your Compaq system and we'll install them at no xtra charge! See "Additional Hardware" boxes on the next ew pages for details.

- Additional Floppy Drive
- Bernoulli Drive
- Tape Backup
- RAM
- Math CoProcessor
- Modem

Everything Overnight® $5.

's the best deal in the business. The entire freight charge r your order is just $5, no matter how much you buy or ow much it weighs. Approved orders placed by 3 a.m. for -stock systems go out right away for next-day delivery. rders for systems with pre-installed hardware or software ee above) must be placed by 10 p.m. ET (weekdays) for ext-day delivery.*

Pre-Installed Software.

Purchase any of the following software programs with your Compaq system and we'll load them at no extra charge! And, while we're at it, we'll even install and de-compress Windows—saving you a good chunk of valuable time. Your machine will arrive totally ready to run.

Microsoft

8326 MS Access for Windows.....$89.
7811 MS Word for Windows.....299.
5680 MS Excel for Windows.....299.
8423 MS PowerPoint.....299.
2735 MS Works for Windows.....129.
8138 MS Office for Windows.....449.
5238 MS Word 5.5.....209.
4348 MS Works.....95.
10059 MS FoxPro for DOS.....299.

WordPerfect

3497 WordPerfect for Windows..279.
3795 WordPerfect for DOS.....265.
7582 WordPerf. Presentations....279.

Borland

1205 Paradox.....529.
10710 Paradox for Windows.....129.
10805 Quattro Pro.....$95.
10616 Quattro Pro for Windows.....95.

Lotus

2756 1-2-3/ Windows.....309.
5416 1-2-3/ DOS Release 3.4.....399.
5652 1-2-3/ DOS Release 2.4.....335.
5799 AmiPro for Windows.....239.
5005 Freelance for Windows.....349.
5982 SmartSuite.....469.

Delrina

10936 WinFax PRO 3.0.....79.

Crosstalk

5611 Crosstalk for Windows.....119.

Symantec

2360 Norton Desktop/Windows..115.

Application Techniques

10950 WinDings – *free with any other pre-installed software listed above.*

PC Connection/CompaqCare Warranty & Service Plan

- 3-Year Limited Warranty covering all Compaq parts and labor.
- On-site 2nd-business-day service during Year 1 (available in all but remote locations). "Carry-in" service for Years 2 & 3: You can either return your computer to us or take it to any of the 2,000 authorized Compaq service locations.
- 30-Day money-back guarantee from PC Connection.
- Toll-free technical support from us (M-F 9 a.m-5:30 p.m. ET) and Compaq (7 days/24 hours).
- COMPAQ Forum on CompuServe.
- PAQFax: information by fax 24 hours a day.
- Optional service/warranty upgrades and self-maintenance programs also available.

HERE'S THE FINE PRINT YOU'VE BEEN LOOKING FOR: Continental U.S. only. Includes Saturday delivery in many locations. Remote locations may require an extra day.

Circle 180 on reader service card

COMPAQ

ProLinea '486

as low as **$1699**

(monitor not included)

The prices are way down. The speed is way up!

There have been price reductions throughout the ProLinea line. And the ProLinea 4/33 now features local bus graphics so it's two to five times faster (equivalent to the Dell ME line) *at a better price than ever!* These full-featured desktop PCs come complete with **MS-DOS 5.0** and **Windows 3.1** ready to run, and we'll install and test any of the "Additional Hardware" listed below at no extra charge. Order your customized Compaq any weekday by 10 p.m. and we'll still ship it for next-day delivery for only $5.*

ProLinea Features:

- Local bus 1024 x 768 video with 1 MB VRAM/256 colors (4/33); 1024 x 768 VGA (4/50)
- The 4/33 is upgradable using OverDrive or VersaChip processors.
- 3.5" 1.44 MB floppy drive
- 101-key keyboard and mouse
- Three 16-bit ISA expansion slots
- 145-watt power supply
- Two serial and one parallel port

ProLinea 4/33

33-MHz 486DX; 4 MB expandable to 32 MB

11588	**Model 240/w+** 240 MB Hard Drive, PFS: WindowWorks, 5¼" Drive, Modem (2400 data, 9600/4800 S/R fax), Prodigy	**$1759**
10844	Samsung SyncMaster 15" Color Monitor	499
10698	Compaq SVGA 14" Color Monitor	349
8943	Intel Overdrive	639

ProLinea 4/50

50-MHz 486DX2; 4 MB expandable to 32 MB

Non-local bus; Special Price! (while supplies last)

10893	**Model 240/w** 240 MB Hard Drive	**$1699**
10844	Samsung SyncMaster 15" Color Monitor	499
10698	Compaq SVGA 14" Color Monitor	349

Additional Hardware

Installed and tested at no extra charge

4194	Colorado Jumbo 120 Tape Backup	$149
4354	Colorado Jumbo 250 Tape Backup	215
10941	Practical Peripherals 2400 data, 9600 S/R internal fax/modem	95
10942	Practical Peripherals 14,400 data, 9600 S/R internal fax/modem	199
6502	Iomega Bernoulli Insider 90 MB PRO	579
6951	Teac 1.2 MB Floppy Drive	59
10744	Kingston 4 MB memory upgrade	179
10743	Kingston 8 MB memory upgrade	395

Note: All Compaq hardware options (drives, modems, etc.) are also available from us. Call for more information.

**Here's that fine print again: Continental U.S. only. Includes Saturday delivery in many locations. Remote locations may require an extra day.*

PC CONNECTION COMPAQ HOTLINE 800-998-0003

CUSTOMIZING? Order by 10 p.m. ET and we'll still ship OVERNIGHT FOR $5.

COMPAQ

DESKPRO/i '486

as low as **$1499**

(monitor not included)

The New Price/Performance Standard For Desktop PCs.

The DESKPRO/i series delivers the latest high-performance features including an integrated QVision 1024 Graphics Controller which *PC Magazine* praised for its "incredible performance—among the fastest we've seen for any system." You also get Compaq's exclusive VersaChip Upgrade Architecture which can take you as high as the new 486DX2/66 (when available), built-in audio capability for recording business messages, and more. All in a small footprint at a small price.

DESKPRO/i Features:

- QVision 1024 Graphics with up to 256 colors and resolutions up to 1024 x 768
- Business audio system including microphone, speaker, and software (not for games)
- 3.5" 1.44 MB floppy drive
- 101-key keyboard and mouse
- MS-DOS 5.0 and Windows 3.1
- Three 16-bit ISA expansion slots
- 145-watt power supply
- Serial and parallel port
- Compact footprint: 15.9"W x 15.1"D x 4.0"H

DESKPRO 4/25is

25-MHz 486SX; 4 MB expandable to 32 MB

11453	**Model 120/w** 120 MB Hard Drive	**$1499**
11452	**Model 240/w** 240 MB Hard Drive	$1679
10063	Mag Innovision MX15 15" Color Monitor	599
4249	NEC 4FG 15" Color Monitor	799
10844	Samsung SyncMaster 15" Color Monitor	499
10694	Compaq QVision Color Monitor	1146
8948	Intel Overdrive	479

Additional Hardware*
Installed and tested at no extra charge

10959	Kingston 1 MB memory upgrade	$69
10960	Kingston 2 MB memory upgrade	109
10961	Kingston 4 MB memory upgrade	169
10962	Kingston 8 MB memory upgrade	379
5409	Intel Math CoProcessor 80387DX	85
4194	Colorado Jumbo 120 Tape Backup	149
4354	Colorado Jumbo 250 Tape Backup	215
10942	Practical Peripherals 14,400 data, 9600 S/R internal fax/modem	199
6502	Iomega Bernoulli Insider 90 MB PRO	579
6951	Teac 1.2 MB Floppy Drive	59

Note: All Compaq hardware options (drives, modems, etc.) are also available from us. Call for more information.

Shift into Overdrive!

Some ProLinea and DESKPRO machines are designed so you can upgrade to more powerful processors including the new **speed-doubling** DX processors as they become available (and as your needs grow). Note: while upgrading gives you the full processing power of a machine built around that chip, it's important to remember that performance does depend on other factors such as amount of RAM, hard-disk speed, and the applications being used.

**More fine print? Oh no! Oh yes! Because the boss wanted us to remind you that we'll install and test the additional hardware listed on the left or the software on the first page of this ad at no extra charge. And, if you order your customized Compaq any weekday by 10 p.m. ET, we'll still ship it for next-day delivery. With, of course, the usual caveats: Continental U.S. only. Includes Saturday delivery in many locations. Remote locations may require an extra day.*

PC CONNECTION COMPAQ HOTLINE 800-998-0003

Circle 180 on reader service card

COMPAQ

DESKPRO/M

as low as **$2449**

(monitor not included)

They're full-powered and fully upgradable.

Compaq's DESKPRO/M computers are designed to be upgradable. They feature a modular system design in which the key subsystems are divided into five separate boards: processor, memory, video, I/O, and EISA bus boards, all of which are upgradable. So, for example, if you need more power in the future, you'll be able to move right up to Intel's new Pentium processor as it becomes available. In fact, these DESKPRO/M machines won *PC Magazine*'s Editors' Choice (12/8/92) for Upgradable PCs and the DESKPRO 66M also won an Editors' Choice (12/22/92) for Technical Excellence.

The DESKPRO/M models we offer feature Compaq's own QVision Graphics Controller that has a built-in 32-bit graphics accelerator. And they include a business audio system (microphone, speaker, and software) for incorporating audio into your multimedia applications.

DESKPRO/M Features:

- QVision Graphics Controller with 512K standard, upgrades to 1MB for 1024 x 786 (256 colors) support
- Built-in business audio system for voice annotation, audible proofing, and voice recognition
- Five 32-bit EISA expansion slots (four available after maximum memory installed)
- Four internal bays for storage devices
- 3.5" 1.44 MB floppy drive
- Ports: one parallel, two serial, mouse, external VGA, audio adapter with input/output jacks
- MultiLock security features
- 240 watt power supply with automatic line switching
- MS-DOS 5.0 and Windows 3.1

DESKPRO 4/66M

66-MHz 486DX2; 8 MB expandable to 64 MB

$3649

11646	**Model 510/w** 510 MB Hard Drive	
10063	Mag Innovision MX15F 15" Color Monitor	599
4249	NEC 4FG 15" Color Monitor	799
10844	Samsung SyncMaster 15" Color Monitor	499
10694	Compaq QVision 170 17" Color Monitor	1146

DESKPRO 4/50M

50-MHz 486DX2; 8 MB expandable to 64 MB

$3349

11644	**Model 340/w** 340 MB Hard Drive	
11642	**Model 120/w** 120 MB Hard Drive	$2749
10063	Mag Innovision MX15F 15" Color Monitor	599
4249	NEC 4FG 15" Color Monitor	799
10844	Samsung SyncMaster 15" Color Monitor	499
10694	Compaq QVision 170 17" Color Monitor	1146

DESKPRO 4/33M

33-MHz 486DX; 4 MB expandable to 64 MB

$2449

11639	**Model 120/w** 120 MB Hard Drive	

**Remember—how could you forget?—that we'll install and test the software listed previously at no extra charge. And, if you order your customized Compaq any weekday by 10 p.m. ET, we'll still ship it for next-day delivery. With, of course, those same old delicious caveats: Continental U.S. only. Includes Saturday delivery in many locations. Remote locations may require an extra day.*

PC World World Class Award/ Best Mail Order Company

We're not trying to win any popularity contests. (But we did!)

1990	1991	1992
1. PC CONNECTION	1. PC CONNECTION	1. PC CONNECTION
2. CompuAdd	2. CompuAdd	2. Gateway 2000
3. Dell Computer	3. Telemart	3. Dell Computer
4. Telemart	4. Gateway 2000	4. Tiger Software
5. Gateway 2000	5. Dell Computer	5. Micro Warehouse

COMPAQ

LTE Lite

as low as **$2849**

Order by 10 p.m. ET and we'll *still* ship **CUSTOMIZING?** overnight for **$5.**

Crystal-Clear Resolution. Any Time. Any Place.

The LTE Lite is the ultimate in notebook technology—winner of a *PC Magazine* Editors' Choice Award and *PC User Magazine* Gold Award (3/10/92). With its dazzling VGA display and the unique EasyPoint Trackball, this compact 6.4 lb. powerhouse is the perfect choice for people who don't want to sacrifice performance when they go on the road.

LTE Lite 3/25c (Color)

25 MHz 386SL; 4 MB expandable to 20 MB

9553 **Model 120/w** 120 MB Hard Drive **$3499**
9554 **Model 84/w** 84 MB Hard Drive $2929

LTE Lite 3/25e

25 MHz 386SL; 4 MB expandable to 20 MB

11590 **Model 120/w** 120 MB Hard Drive **$2999**
11589 **Model 84/w** 84 MB Hard Drive $2849

LTE Lite Features:

- **3/25c:** 8.4" Active Matrix Color VGA display with 640 x 480 capability (256 colors from a palette of 4,096)
- **3/25e:** Active Matrix B&W 9.5" VGA display upgradable to Active Matrix Color VGA display
- 3.5" 1.44 MB floppy
- 79/80-key keyboard with isolated, inverted "T" cursor keys
- Built-in EasyPoint Trackball
- NiMH Power Smart Pack with 3-4 hour life
- MS-DOS 5.0 and Windows 3.1

Additional Hardware/Accessories*
No additional charge for installation (where required)

6569	Intel Math CoProcessor 80387SL	$79
1073	Colorado Trakker 250 Tape Backup (parallel)	429
10757	Kingston 2 MB memory upgrade	159
10758	Kingston 4 MB memory upgrade	189
10759	Kingston 8 MB memory upgrade	375
10517	Megahertz 2400 data, 9600 S/R fax (int.)	215
10518	Megahertz 9600 data, 9600 S/R fax (int.)	479
10515	Megahertz 14,400 data, 14,400 S/R fax (int.)	499
10671	Compaq NiMH Battery	187
10670	Compaq NiCd Battery	121
10662	Compaq Auto Adapter	93
10664	Compaq External Battery Charger	87
10672	Compaq Quick Connect	79
10665	Compaq Desktop Expansion	599
7060	Kensington MicroSaver (security device)	39

Note: All Compaq hardware options (drives, modems, etc.) are also available from us. Call for more information.

PC CONNECTION COMPAQ HOTLINE 800-998-0003

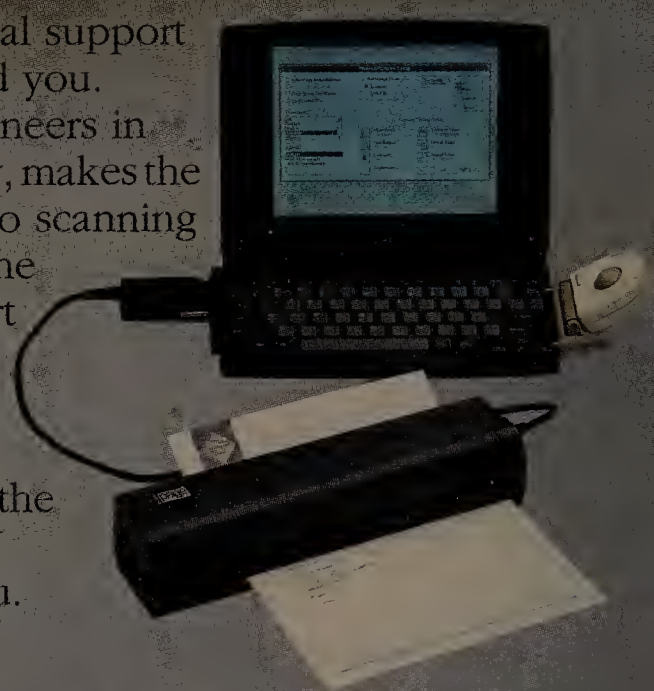
Circle 180 on reader service card

Our portable full-page scanner is a foot long. And cuts the mustard.

Introducing the world's first and only portable, full-page scanner: The NISCAN Page. At under three pounds, the Page is everything you've been waiting for. And less.

400 dpi resolution. 256 shades of gray. You get advanced OCR, image editing and fax-on-the-fly software for any IBM-compatible PC or notebook. And it's equipped with a rechargable battery and an AC adaptor. (Condiments extra.) Plus, there's a one year warranty, service and technical support always right behind you.

NISCA, pioneers in imaging technology, makes the Page your answer to scanning on the run. Make the NISCAN Page a part of your arsenal in the office, at home or on the go. Call (214) 242-9696 for the authorized NISCAN distributor near you.



NISCA

image is everything®

NISCA INCORPORATED 1919 OLD DENTON ROAD • SUITE # 104
CARROLLTON, TEXAS 75006 • Office: 214 / 242-9696 • Fax: 214 / 245-0942
NISCA CORPORATION, KOFU, JAPAN

GSA # GSOOK93AG56180

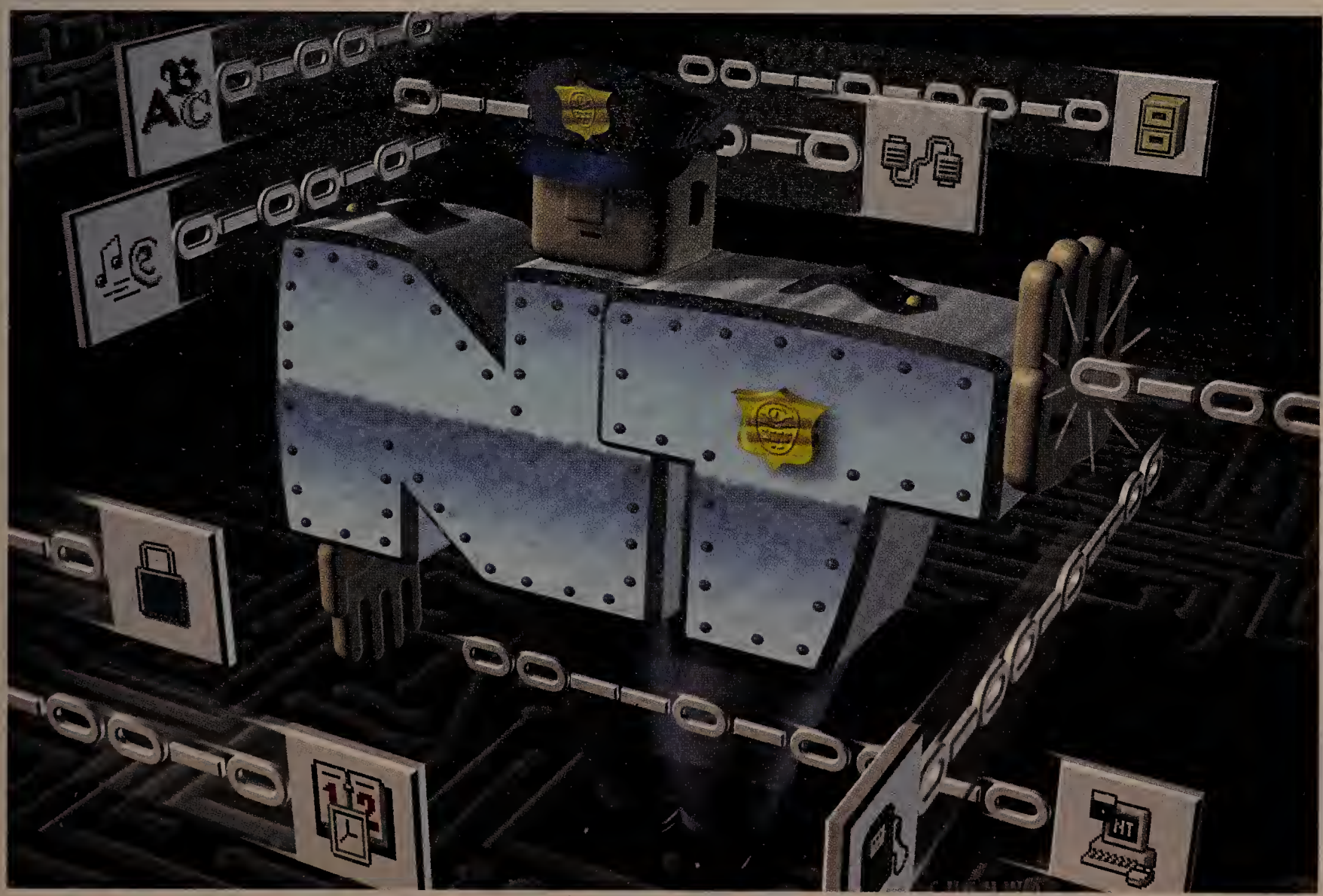
Circle 139 on reader service card

Windows NT: The New DOS?

Microsoft's robust new operating system may put DOS out to pasture someday, but not in 1993.

BY NOW YOU MAY HAVE HEARD that Windows NT is either an overpriced and hardware-intensive boondoggle or the environment that *Windows,* DOS, OS/2, and even UNIX should have been all along. In truth, it's a little of both. Technically, NT's a wonderful operating system that combines the familiar *Windows* interface with a robustness and reliability that the rickety old DOS-*Windows* combination can't match. But NT requires a powerful computer to work properly, and some compatibility issues still need to be worked out. In other words, don't run out and upgrade without giving it some careful thought.

By Scott Spanbauer



TOM CUSHWA

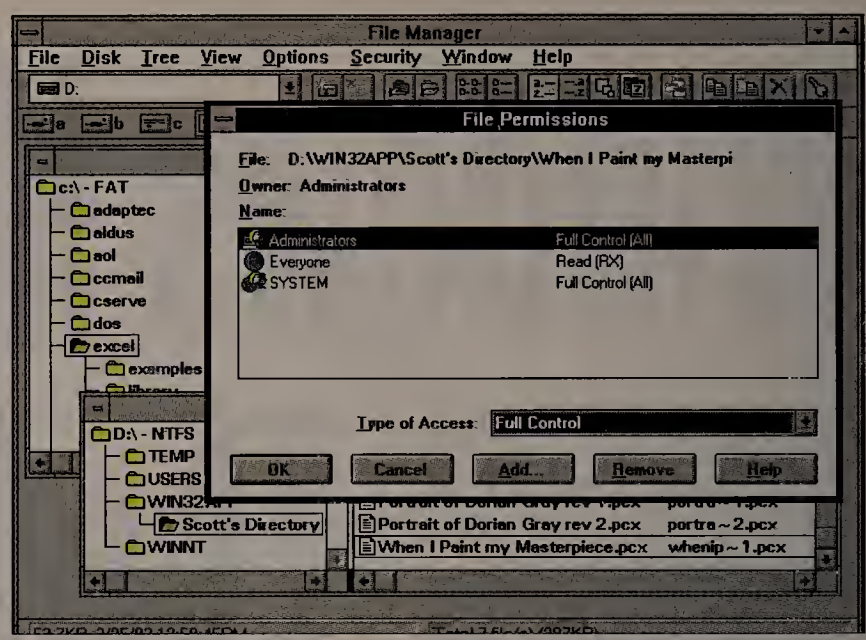
We described Windows NT's core features in depth last year (see "Windows NT: A DOS for the '90s," December 1992). NT's multitasking, we noted, is considerably more dependable than *Windows 3.1*'s, and applications can be more responsive. NT is both a network and workstation operating system, with many security features built in. File names need not be limited to eight plus three characters. And since NT doesn't have to sit on top of DOS, it's less prone to crashing and can address all of a computer's memory directly.

While most features remain unchanged in the March 1993 beta version we examined, Microsoft has added some modular functions, including TCP/IP protocols for connecting to UNIX networks, and a tool to let remote users dial in to, use, and even manage an NT network. As we went to press, Microsoft was predicting that NT would hit the streets before July and cost less than—gulp—$500.

Worth the Price?

Even if Windows NT debuts at a bargain price, will it be worth it? The program can take up as much as 70MB of hard disk space *before* you add applications and data, and it requires a bare minimum of 8MB of RAM. In addition, it may not adequately support your video, network, and other adapters and, more important, your key applications. Finally, how will Windows NT applications—when they appear—improve on *Windows 3.1* programs?

NT is a 32-bit operating system and requires a 32-bit processor, specifically a 386, a 486, Intel's new Pentium, or a MIPS R4000 or R4400 RISC chip. A version will also ship for the 64-bit DEC Alpha AXP. Microsoft says applications written to run in this 32-bit–memory nirvana will be faster because they'll perform calculations and access memory—up to 4 gigabytes of it—using one processor instruction instead of doing it piecemeal as DOS (and with it, *Windows 3.1*) does. The speedup could be as much as 20 percent over equivalent 16-bit processes, the company says, depending on the nature of the application. This remains to be seen, since no such applications are currently available for testing. It's important to note that you'll be able to run most forthcoming 32-bit *Windows* programs under *Windows 3.1* and that they may perform just as well there—although without NT's other advantages. Since Windows NT handles all the RAM in your system the same way, it offers at least one clear advantage: Unencumbered by DOS's 640K memory limit, you may never have to worry about extended, expanded, conventional, and upper memory again.



WINDOWS NT'S FILE MANAGER resembles the one in Windows for Workgroups but offers security controls and long file names.

Windows' multitasking has always left a lot to be desired, but with NT those desires finally get fulfilled. Part of the reason is preemptive multitasking. In *Windows 3.1*'s nonpreemptive model, the program currently using the processor decides when to relinquish control. This scheme is usually fine for downloading a file or sorting a large database in the background, but it can break down under conditions that require the computer to respond to external events in a timely fashion—such as answering a fax-modem or serving a network. With Windows NT's preemptive multitasking, the operating system decides when to allow access to the processor and can turn it over to higher-priority programs when they demand it. In *Windows 3.1*, applications that freeze up while in control of the processor bring the whole system to a halt until you remove them from memory (by pressing <Ctrl>-<Alt>-<Delete>). Theoretically, such a seizure will never occur in Windows NT.

IT'S WINDOWS, RIGHT? Wrong. Windows NT looks like Windows 3.1, but note the computer and user names and other differences.

Fine Threads

NT also boasts multithreading, in which an application performs its tasks in separate, concurrent "threads" rather than in one sequential queue. This capability can improve overall performance and provide a more responsive user interface. For example, a multithreaded word processor would allow you to continue working while it formats a 20-page report for the printer. By contrast, a single-threaded *Windows* program would not let you open a document while it is formatting another.

It may be a while, however, before multithreading appears in many commercial applications. Multithreaded programs are more difficult to design and write, so vendors will probably be slow to offer them. What's more, multithreading is not part of the Win32s API, the subset of NT programming instructions that allows 32-bit applications to run under *Windows 3.1*. Developers looking to build applications that run under both types of Windows may skip multithreading entirely.

Windows NT's user interface, identical in most ways to *Windows 3.1*'s, is a prime ex-

ample of multithreading's benefits. Under *Windows 3.1*, when you click on an icon to launch an application, you can't do anything else until the application has finished loading. By contrast, Windows NT allows you to click on other icons or switch to another application and continue working while the application loads.

For high-end systems that have more than one CPU, NT supports symmetric multiprocessing, which divvies up processing tasks among multiple CPUs, further boosting a system's responsiveness. A number of manufacturers, including Acer, ALR, AST, Compaq, Hauppauge, and NCR, have announced or already shipped multiprocessor systems tailored to Windows NT. The combination of preemptive multitasking, multithreading, and multiprocessing could make Windows NT a killer network or application server running, say, a multithreaded SQL database back end. Windows NT could compete with minicomputers for sensitive, transaction-intensive applications such as order entry and billing systems.

But back to the desktop. Until 32-bit applications come along, you'll be running your same old DOS and 16-bit *Windows* programs, as well as character-based OS/2 1.3 and POSIX-based UNIX applications. You can launch any of them from a Program Manager icon or from NT's command shell—a highly realistic rendition of the DOS prompt that provides new-and-improved versions of familiar DOS commands and a few badly needed new ones. There are commands for changing directories and then easily returning to the directory you left, and there's a much more powerful file searching program than the one that comes with DOS.

At some point last year, Microsoft made the mistake of stating it would test the top 100 DOS and *Windows* applications to make sure they ran under NT. Now the company simply says that NT will run "hundreds" of applications without trouble and that it won't be publishing a specific list of compatible programs. In fact, the latest beta version of Windows NT ran every DOS and 16-bit *Windows* application I threw at it, with one exception: *WinFax Pro*, which could neither send nor receive a fax.

Microsoft says no existing 16-bit fax driver will work with Windows NT, and it suggested we contact the fax software manufacturer to find out when new drivers would appear. Delrina Technology, maker of *WinFax Pro*, stated its intention to support Windows NT but couldn't say when a version would appear. If you rely on a fax-modem, this simple lack of a driver is enough to prevent you from adopting Windows NT, no matter how attractive its many other features are.

The bottom line is that NT won't allow applications to manipulate hardware directly—they must use a virtual-device driver, which allows NT's security layer to confirm that the program isn't a virus, a hacker, or a politician. As a result, getting scanning software, for instance, to work under NT is an iffy prospect, and programs whose main purpose is to blatantly "touch" hardware, such as disk optimizers, are out.

A multithreaded word processor would allow you to continue working while it formats a 20-page report for the printer.

Heavy Metal, Please

The hardware price for NT's power is steep. In addition to a fast 32-bit CPU, you'll need a minimum of 8MB of RAM. The beta version reeommends 16MB, a number Microsoft says may shrink in the released product. You'll also need at least 70MB of free hard disk space to install the operating system. Add in more space for all your existing applications, and even a 200MB hard disk will fill up quickly.

Device drivers written for *Windows 3.1* won't work with NT, and that's a problem. Windows NT comes with drivers for quite a few video adapters, mostly newer ones. Older super-VGA boards, such as the Tseng ET3000–based Orchid ProDesigner Plus, may be limited to 640 by 480 VGA mode until manufacturers decide it's worth the trouble to write NT-compatible drivers. (Microsoft says NT will ship with drivers for most ET4000- and S3-based boards.)

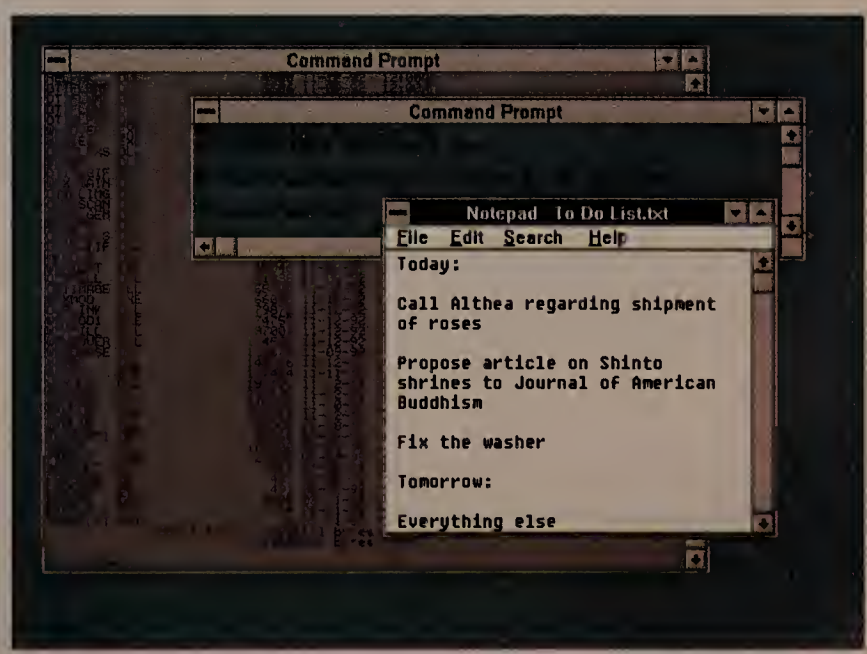
Microsoft can't or won't promise to support every piece of hardware under Windows NT and relies mostly on manufacturers to write their own drivers. A final list of supported hardware was unavailable as we went to press, but an NT product manager suggested that NT will come with drivers for most devices that *Windows 3.1* supports.

If NT is successful, of course, hardware manufacturers will scramble to rewrite drivers for all their video boards, network adapters, and other devices. In the meantime, though, users will have to struggle.

Getting It Going

Installing Windows NT from a CD ROM (like OS/2, it will also be available on a score or so of floppies) starts out much like a *Windows 3.1* installation. The first major difference comes when the system asks you to pick a file system: DOS's File Allocation Table (FAT) system, or the NT File System (NTFS), which allows long file names, provides sophisticated file security, and uses the hard disk more efficiently.

If you're installing NT over an existing DOS partition, you have the option of replacing the FAT system with NTFS without destroying existing files. You can also install a foolproof multiple-boot utility that lets you choose whether to run DOS or Windows NT at boot-up. And if you install Windows NT over *Windows 3.1*, NT's setup program will copy many of the settings in your *Windows* WIN.INI file to a separate



START ANY APPLICATION FROM NT'S COMMAND SHELL, or review a long directory listing with its handy scroll bars.

Exactly how fast is graphics performan Image™ Series PCs?

Let's just say we developed Image Video™ technology expressly for all you high-performance speed demons. Fact is, we've engineered our Image™ Series PCs with a powerful combination of our second-generation local bus and graphics accelerator, allowing graphics information to travel directly between the CPU and video memory, so Windows™ is a breeze and you can sprint through today's most demanding graphics applications.

NEC has the ultimate system for graphics applications: lightning-quick Image Series PCs with integrated SCSI II interface, legendary MultiSync FG monitors, and our pioneering CD-ROM readers with MultiSpin™ technology.

Based on Intel's powerful 486 chip, each Image Series PC has OverDrive™ capability for easy processor upgradability. An on-board SCSI II interface means you can quickly connect to a wide variety of peripherals. And with our new OptiBus™ technology, your peripheral performance is up to 30% faster than ordinary systems. We've even made it easier for you to network your PCs with an optional factory-integrated, high-performance 10BaseT Ethernet® adapter.

Plus, every Image Series PC is designed with True Color support of up to 16.8 million colors for photo-realistic images, as well as our exclusive ImageSync™ technology for flawless performance when connected to our award-winning MultiSync® FG™ series monitors. The result? Clear, flicker-free images without any adjusting.

So call 1-800-NEC-INFO (in Canada, 1-800-343-4418), or NEC FastFacts™ at 1-800-366-0476 (# IMAGE). Then hold on to your spots.

Because ⬆ is the way you want to go.

NEC

MultiSync is a registered trademark and FG, Image, Image Video, ImageSync, OptiBus, MultiSpin and FastFacts are trademarks of NEC Technologies, Inc. The Intel Inside logo is a registered trademark of Intel Corp. All other trademarks or registered trademarks are the property of their respective holders. NEC GSA #GS00K91AGS5241 © 1993 NEC Technologies, Inc.

Circle 203 on reader service card

the
ce of NEC's

Windows NT WIN.INI used when running 16-bit *Windows* programs.

Unfortunately, Windows NT is unable to read partitions compressed by DOS 6.0's DoubleSpace or any other compression utility (it can read compressed volumes across a network, of course). If you're currently keeping data on a compressed partition, you'll have to either decompress your files first or install NT somewhere else. Installing NT on a fresh partition means that it won't migrate all your existing *Windows* application configuration information, so you'll have to either edit the resulting NT WIN.INI file by hand or reinstall your applications.

Windows NT: The Network

Windows NT was built from the ground up to network. A special version, Windows NT Advanced Server, is a powerful network operating system intended to compete with Novell NetWare. But the plain, desktop-oriented Windows NT can handle small networks itself.

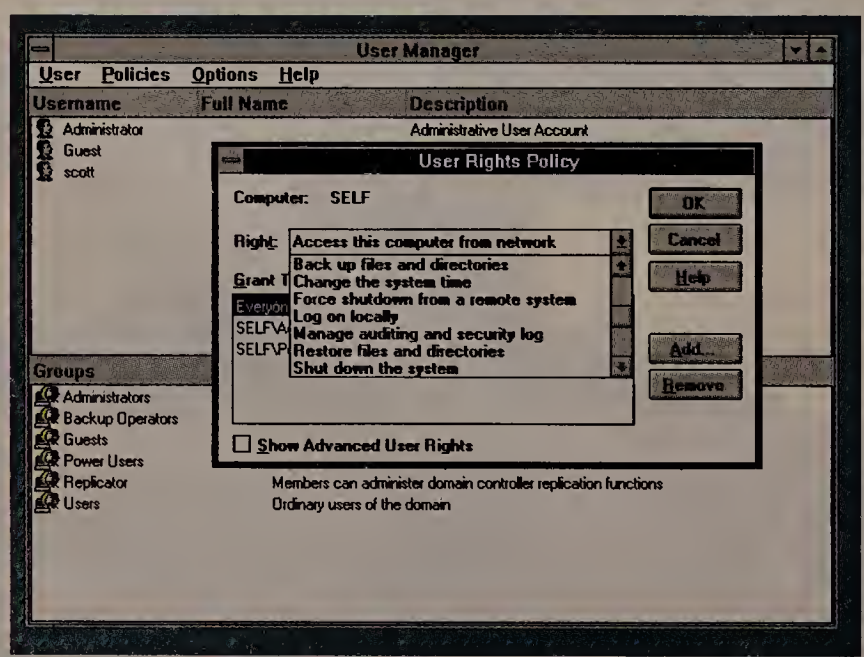
Go out and buy 20 486-33s, 20 network adapters with cabling, and 20 copies of Windows NT, and you have an instant network—all you have to do is name your work group. Like *Windows for Workgroups*, NT even bundles in *Microsoft Mail* and the *Schedule+* group calendar. If you believe Microsoft, individual users (assuming they're not computer impaired) will be able to install and configure Windows NT in a snap, then get right to work.

In the real world, however, you rarely get to start completely from scratch. If you're already networked, chances are you're running Novell NetWare, and few companies will scrap their corporatewide NetWare LANs on Friday, install Windows NT over the weekend, and pick up where they left off come Monday.

Fortunately, Windows NT systems will be able to hook up to other LANs. Microsoft is working with Novell and Banyan to create ways for NT to work with their LANs, and the necessary software is expected to come with the shipping version of NT. Windows NT will enable its systems to act not only as clients, but also as high-powered application servers, running client-server back ends like *SQL Server* on LANs other than its own.

Windows NT is unable to read partitions compressed by DOS 6.0's DoubleSpace or any other compression utility.

If there's any reason to chuck NetWare in favor of NT's networking, it's security. Windows NT is designed to be almost entirely hackproof. During installation, every NT system asks you to choose an account name and password and a password for an administrator account. Subsequently, users without a password won't have access to your files, even if they try to reboot from a floppy—as long as you're using the NT File System. Likewise, networked NTFS drives are impenetrable to those prohibited from accessing the drive. The only gaps are that anyone with a copy could reinstall NT over your setup, destroying existing data, and extremely determined spooks could use a disk editor to read your hard disk bit by bit.



SAFETY FIRST: Windows NT's pervasive security features let networked users pick and choose exactly who can access specific files.

Windows NT's built-in networking should be fine for department-size networks, but companywide LANs that run critical applications will require more powerful tools, and that is where Windows NT Advanced Server comes in. This powerful but complicated system will enable network administrators to manage multiple work groups, recover from disk errors on the fly, and add Macintoshes to the network.

The work-group management comes through the concept of domains, which shift responsibility for user names and passwords from individual workstations to centralized servers capable of communicating with each other and resolving naming conflicts. As a result, users can have faster access to systems across the network, and administrators needn't worry about maintaining unique user accounts. Windows NT Advanced Server's disk mirroring, drive duplexing, and drive array features allow a dedicated NT server to continue serving, without loss of data, should one of its hard disks fail. The Macintosh gateway will permit up to 256 Macs to access a Windows NT Advanced Server as they would any Mac server. Microsoft says Windows NT Advanced Server will cost less than $5000 for an unlimited number of users and that the upgrade policy for current *LAN Manager* sites will be competitive.

Join the NT Generation—Someday

So who is Windows NT really for? Individual users looking for the Rolex version of the current Timex *Windows?* Corporations hoping to avoid buying yet another expensive minicomputer? Is NT a reasonable replacement for the DOS-*Windows* combination? Or for OS/2? (We'll be conducting a Windows NT–OS/2 2.1 face-off in an upcoming issue.)

More important, is Windows NT for you? Do you own or plan to buy hardware that can handle it? Is your system free of software that addresses your hardware directly? And are you willing to use a relatively untried operating system? If so, the stability, robust multitasking, improved performance (which is still theoretical), multiprocessing, security, and advanced networking could prove to be substantial rewards. Otherwise, the DOS-based *Windows* will serve just fine for a bit longer. After all, they both come with Solitaire.

Scott Spanbauer is a contributing editor for PC World. *He can be reached as SCOOTSPAN on PC World Online (see page 10 for more information).*

Hundreds Of Companies Can Sell You A Computer Through The Mail.

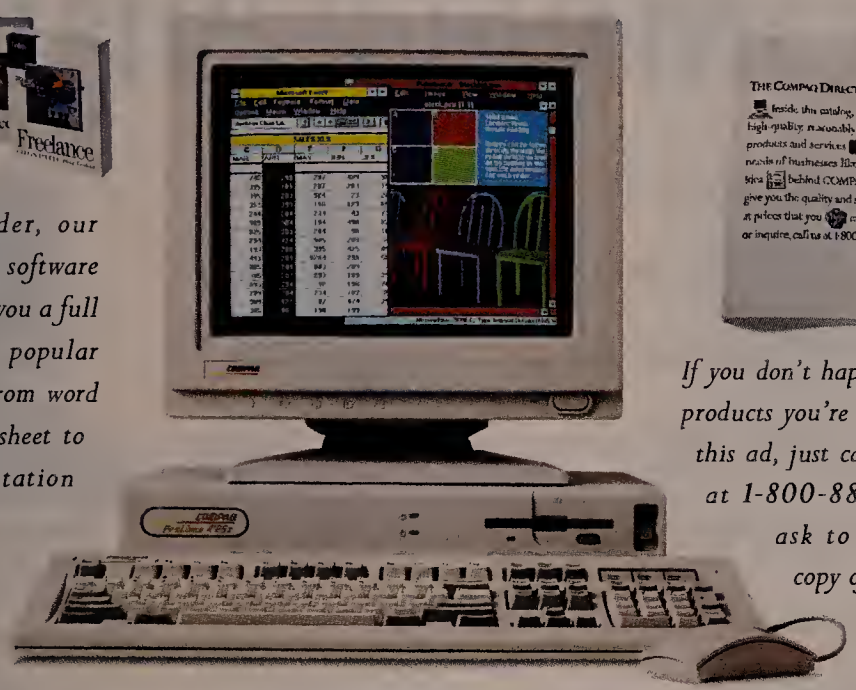
BUT THERE'S ON
THAT CAN DI

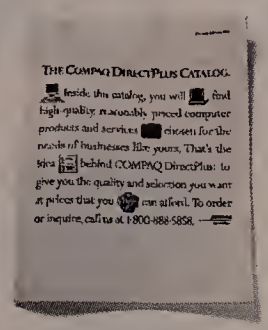
Announcing COMPAQ DirectPlus, a way for you to get the quality and reliability Compaq is known for, through the convenience of buying direct. We offer popular COMPAQ PCs and the industry's leading software, all at competitive prices—the kinds of products you've asked for based on your computing needs. That's the idea behind COMPAQ DirectPlus: to deliver the quality and flexibility you want, without expanding your budget.

Known for quality and reliability, Compaq offers you some of the best-engineered computer products in the industry—at very attractive prices. Everything from innovative notebook PCs to versatile desktops.

LY ONE COMPANY LIVER ALL THIS.

As an industry leader, our alliances with leading software companies let us offer you a full selection of the most popular software, everything from word processing and spreadsheet to database and presentation graphics.





If you don't happen to see the products you're looking for in this ad, just call us toll-free at 1-800-888-5830 and ask to receive your copy of our catalog.

Our service and support options offer everything from on-site installation by a Compaq-authorized technician to on-line diagnosis of technical problems on your PC.

We've put together a variety of special solutions for you. All of them are competitively priced and well-suited to the kinds of business functions you perform every day.

All of our PCs are backed by the industry's first 3-year warranty, as well as 24-hour, 7-day technical hot-line support.*

Many of the popular software titles we offer you can be preinstalled onto any computer that you purchase from us—at no additional charge.

We give you lots of choices, including a leasing program and a trade-in option that lets you trade in select COMPAQ, Apple and IBM PCs. We also offer a variety of purchasing options.

Call 1-800-888-5830 and talk to an Account Representative who's trained to help you decide what products and service options are best for your particular requirements.

COMPAQ
DirectPlus

1 800 888-5830

*Certain restrictions and exclusions apply, see next page.

Circle 47 on reader service card

WHY BUY JU
COMPUTER WHEN
COMPAQ AT PRIC

All our PCs are backed by the COMPAQ free 3-year warranty†—the first such warranty in the industry. We can offer this kind of long-term guarantee because of our quality and testing standards. Prices include COMPAQ Monitors. Call for details on other COMPAQ desktops and notebooks, as well as printers.

COMPAQ ProLinea 3/25s
25-MHz 386SX, 2-MB RAM, 120-MB hard drive, VGA Color Monitor. An affordable entry-level desktop PC.

†Restrictions and exclusions apply. Monitors, battery packs and certain options are covered by a one-year warranty. *Leasing is provided by GE Capital Corporation for a term of 36 months, and is subject to approved credit and certain terms and conditions. Call for details.**Requires a 1024 Color Monitor.

T ANOTHER YOU CAN GET A ES LIKE THESE?

COMPAQ ProLinea 4/25s
5-MHz 486SX, 4-MB RAM, 120-MB rd drive, SVGA Color Monitor. Great r everyday business applications.

COMPAQ ProLinea 4/33
33-MHz 486DX, 4-MB RAM, 120-MB hard drive, SVGA Color Monitor. Designed for more advanced applications.

COMPAQ ProLinea 4/66
66-MHz 486DX2, 4-MB RAM, 120-MB hard drive, SVGA Color Monitor. For high performance at an affordable price.

ProLinea Features

3½" 1.44-MB diskette drive ◆ 1024 x 768 local bus video graphics with 1-MB VRAM in up to 256 colors (on 486 models) ◆ 3 expansion slots ◆ 3 internal storage device positions ◆ Security features ◆ COMPAQ Color Monitor, preinstalled MS-DOS 6.0 and Microsoft Windows 3.1 and a COMPAQ Mouse.

DESKPRO/i Features

*3½" 1.44-MB diskette drive ◆ Integrated QVision Graphics displays up to 256 colors at 1024 x 768 with 512-KB VRAM option** ◆ 3 expansion slots ◆ 3 internal storage device positions ◆ Security features ◆ Business Audio ◆ COMPAQ Color Monitor, preinstalled MS-DOS 6.0, Microsoft Windows 3.1 & Sound System Software, COMPAQ Mouse & Microphone.*

COMPAQ DESKPRO 4/25is
25-MHz 486SX, 4-MB RAM, 120-MB hard drive, SVGA Color Monitor. Delivers fast, high-resolution graphics in Windows.

COMPAQ DESKPRO 4/33i
33-MHz 486DX, 4-MB RAM, 120-MB hard drive, SVGA Color Monitor. For even faster performance in a Windows environment.

intel inside

Contura Features

3½" 1.44-MB diskette drive ◆ Power conservation and security features ◆ Battery ◆ AC Adapter ◆ Preinstalled MS-DOS 6.0, Microsoft Windows 3.1 and EZ Help On-Line Library and a COMPAQ Trackball.

COMPAQ Contura 3/25
25-MHz 386SL, 4-MB RAM, 120-MB hard drive, monochrome VGA display, 6.2 lbs. An affordable notebook loaded with features.

COMPAQ Contura 4/25
25-MHz 486SL, 4-MB RAM, 120-MB hard drive, monochrome VGA display, 6.2 lbs. Upgradeable to Active Matrix Color Display.

COMPAQ
DirectPlus

1 800 888-5830

Circle 47 on reader service card

We Offer Spe
Called Bundles
That's What

We've put together these bundles to make it easy to get the hardware and software that you need in a complete system, at one special price. No matter what your computing needs, chances are that one of these bundles will fit the bill. Not only that, but the price you'll pay will fit well within your budget.

The Basics Plus.

COMPAQ ProLinea 4/25s
25-MHz 486SX, 4-MB RAM, 120-MB hard drive, SVGA Color Monitor.

Data+Fax Modem

WinFax PRO for Windows

Microsoft Works for Windows

Calendar Creator Plus Windows

AfterDark for Windows

Quicken for Windows

This entry-level system gives you a full range of business and persona applications as well as data an fax communications—all at a su prisingly low price.

$1,675
*Or $60 per month**

*Leasing is provided by GE Capital Corporation for a term of 36 months, and is subject to approved credit and certain terms and conditions. Call for details.

CIAL SOLUTIONS BECAUSE IN THE END, YOU'LL SAVE.

The Front Office.

COMPAQ ProLinea 4/33
33-MHz 486DX, 4-MB RAM, 120-MB hard drive, SVGA Color Monitor.

Quattro Pro for Windows

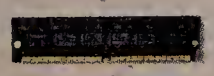
WordPerfect for Windows

This general business solution, which is offered to you at a very competitive price, teams up two popular word processing and spreadsheet applications.

$2,099
*Or $75 per month**

The Windows Office.

COMPAQ DESKPRO 4/33i
33-MHz 486DX, 4-MB RAM, 240-MB hard drive, 1024 Color Monitor.



Extra 2-MB of RAM

The Microsoft Office for Windows

This solution can utilize COMPAQ business audio with the most popular Microsoft applications. The Microsoft Office includes Microsoft Excel, Word, PowerPoint and Mail.

$2,799
*Or $100 per month**

The Office Pro.

COMPAQ ProLinea 4/50
50-MHz 486DX2, 4-MB RAM, 240-MB hard drive, SVGA Color Monitor.

Extra 4-MB of RAM

14.4-Kbps Data+Fax Modem

WinFax PRO for Windows

Lotus SmartSuite for Windows

This solution offers data and fax communications with popular Lotus applications. Lotus SmartSuite includes Lotus 1-2-3, AmiPro, Freelance Graphics, Organizer and cc:Mail.

$2,999
*Or $107 per month**

COMPAQ
DirectPlus

1 800 888-5830

Circle 47 on reader service card

Now, Choosing What's Right For Your Business Is An Easy Call.

1 800 888-5830

Call us toll-free to inquire about the quality products and services that we offer you at very competitive prices.

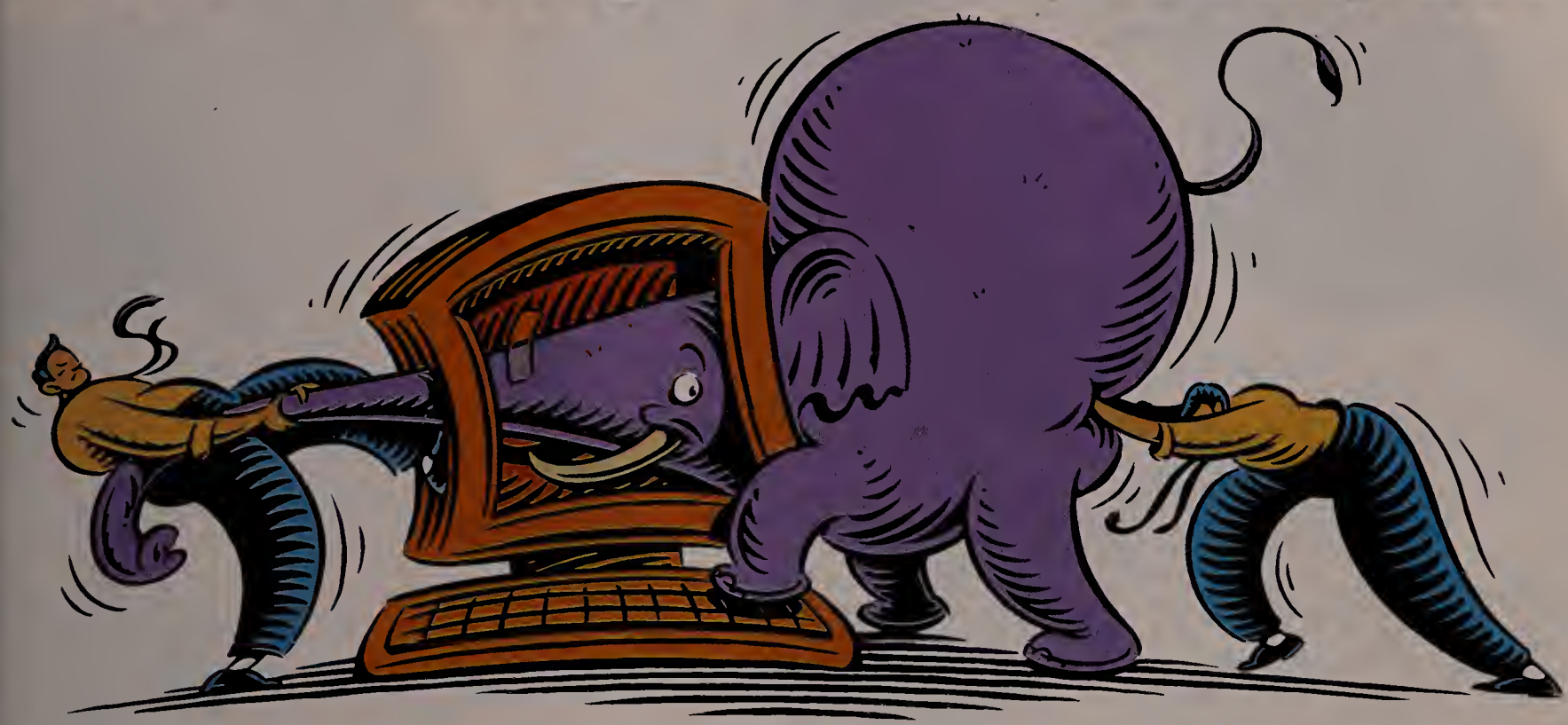
Our specially trained Account Representatives can assist you in choosing a solution that is right for your particular needs. If you don't happen to see the COMPAQ products you want in this ad, just call us and ask about them. Whatever you need, we're here to help. We look forward to your call.

COMPAQ DirectPlus

©1993 Compaq Computer Corporation. All rights reserved. Printed in the USA. Compaq, the COMPAQ logo and DESKPRO Registered U.S. Patent and Trademark Office. Contura and ProLinea are trademarks of Compaq Computer Corporation. COMPAQ DirectPlus and CompaqCare are service marks of Compaq Computer Corporation. Products, prices and programs are subject to change without notice. All products are trademarks or registered trademarks of their respective companies. Microsoft and MS-DOS are registered trademarks and Windows is a trademark of Microsoft Corporation. The Intel Inside logo is a trademark of Intel Corporation.

Circle 47 on reader service card

There's An Easier Way To Get More Memory Into Your Computer



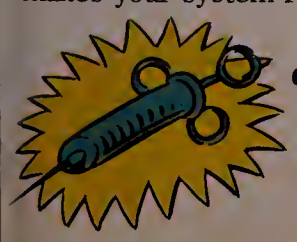
If you've been struggling to get the most out of your PC's memory, there's an easier way. It's called NETROOM – the award winning memory manager that uses the newest technologies to shatter memory barriers, giving you more memory and a faster system.

CRASH-PROOF

With *"Customize"*, NETROOM's crash-proof installation utility, you can configure all of NETROOM's features automatically – just type one command and you're done! Even if you turn off your system in the middle, when you turn it back on *"Customize"* will pick up where it left off. Of course, you can always customize *"Customize"* if you like.

But there's more to memory management than just easy installation. NETROOM includes our revolutionary *"Cloaking"* technology – a technique that allows DOS drivers and TSRs to run in extended memory as if they were running under Microsoft Windows™. *Even if you never run Windows!* If you do use Windows, you'll find our cloaked utilities fully Windows-compatible.

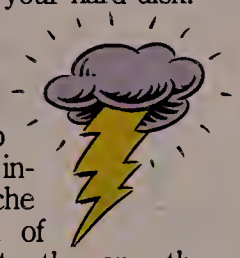
NETROOM provides a cloaked system BIOS for all compatible systems including ISA, EISA, MCA and Laptops. NETROOM's cloaked BIOS is designed to run in the "protected mode" of your 386/486 family processor. This makes it safer to use. The cloaked BIOS also takes full advantage of the 32-bit power of your computer so it runs faster. And it doesn't occupy any DOS memory, so you save up to 96K. Think of it as a *free* BIOS upgrade that saves memory and makes your system run faster.



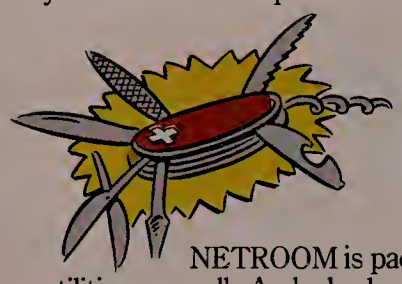
YOUR "FLU" SHOT IS BUILT IN

In NETROOM, virus protection is integral to the cloaked BIOS. It detects when a virus or errant program tries to get at the most vital parts of your hard disk and prevents the damage before it begins. Our cloaked BIOS even stops attempts to destroy your data by reformatting your hard disk.

LIGHTNING SPEED



To really soup-up your system, NETROOM includes a cloaked Disk Cache which occupies only 5K of DOS memory, but runs faster than any other cache. That's because our cloaking technology unleashes the 32-bit power of your system. And, NETROOM provides a cloaked text-mode screen accelerator that makes your screen run up to 20 times faster!



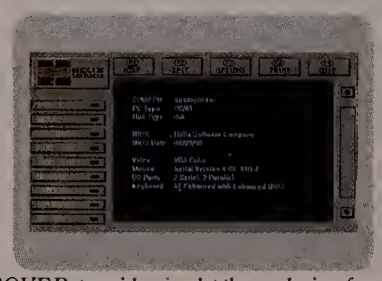
SOME PRETTY SHARP TOOLS

NETROOM is packed with other utilities as well. A cloaked graphical Screen Saver protects your screen from burn-in. A cloaked RAM disk lets you set up the world's largest RAM drive – up to 256Mb. And, cloaked DPMI support provides compatibility with the latest applications.

Colorful screen saver features exciting graphics

SYSTEM REQUIREMENTS: Netroom operates with any 386 or 486 system with at least 1Mb of RAM. Limited support for 286/Neat systems is provided but does not include "Cloaking". For Windows support Netroom requires Windows 3.1 or later (WFW is supported). Microsoft Windows is a trademark of Microsoft Corp.

We topped it all off with our enhanced DISCOVER™ system utility which now sports a snazzy and more easy-to-use graphical interface.



DISCOVER provides in-depth analysis of your PC

SOME TECHNICALITIES

NETROOM supports pooled EMS and XMS memory, all the industry standard specs: EMS 3.2 and 4.0, XMS 3.0, VCPI, EEMS, VDS. NETROOM provides DOS-compatible UMBs and HMA. NETROOM loads FILES, BUFFERS, FCBs and COMMAND.COM high, and manages self-high-loading TSRs and drivers and ROM shadowing and de-shadowing.

NETWORK USERS...

With remote installation, special network support and the lowest cost and most flexible multi-user licensing available, NETROOM has always been the undisputed best choice for corporate and network users. And now, with the power of cloaking and the ease of our new setup utlity, NETROOM is the clear choice for you.

NETROOM... it's like getting an elephant's memory into your PC with a push of a button... for peanuts!

1-USER SPECIAL $79 + S&H

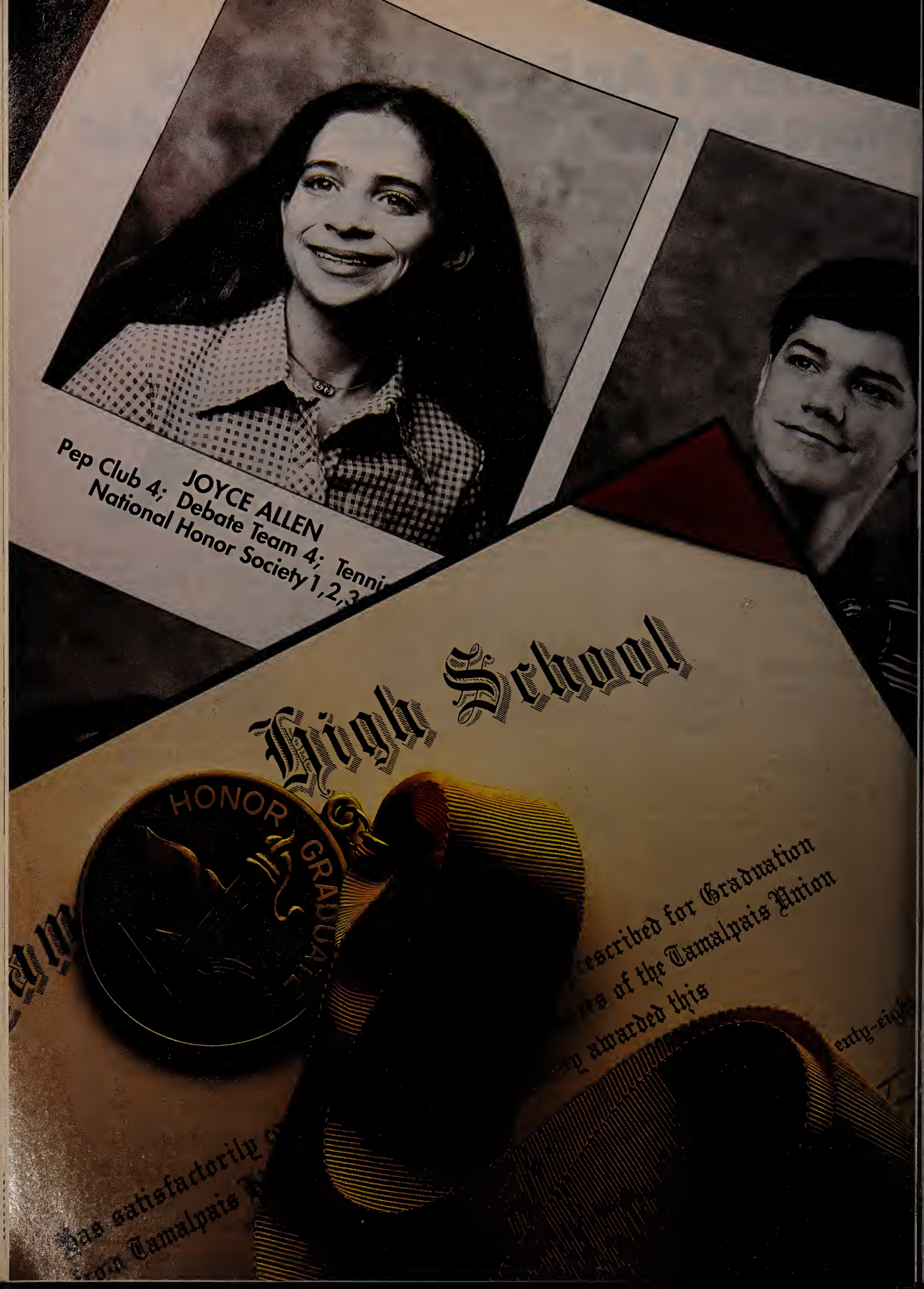
Reg. Price: 1-user $99, 4-users $179 + s&h

1-800-451-0551

NETROOM3

HELIX SOFTWARE CO. 47-09 30th St., L.I.C., N.Y. 11101 (718) 392-3100

Circle 90 on reader service card


JOYCE ALLEN
Pep Club 4; Debate Team 4; Tenni
National Honor Society 1,2,3
High School
HONOR GRADUA
escribed for Graduation
s of the Tamalpais Union
y awarded this
enty-eig
Has satisfactorily
Tamalpais

Microsoft is committed to providing the fastest, most reliable technical support in the industry.

EVER WONDER WHAT HAPPENED TO THAT BRAINY KID WITH ALL THE RIGHT ANSWERS? WE HIRED HER.

In fact, we've hired 1500 other smart people just like her.

Why? So you can have access to the very best technical support in the industry.

So whenever you call us with a question, you'll get the right answer, right away.

And so you can get your job done easier. Faster. Better. Whether you're discovering the magic of spreadsheet formulas for the first time. Or you're just looking for the smoothest, simplest way to zip around the Microsoft® Windows™ operating system.

The way we see it, as people explore the limits of today's more powerful products, the job of providing support becomes critical.

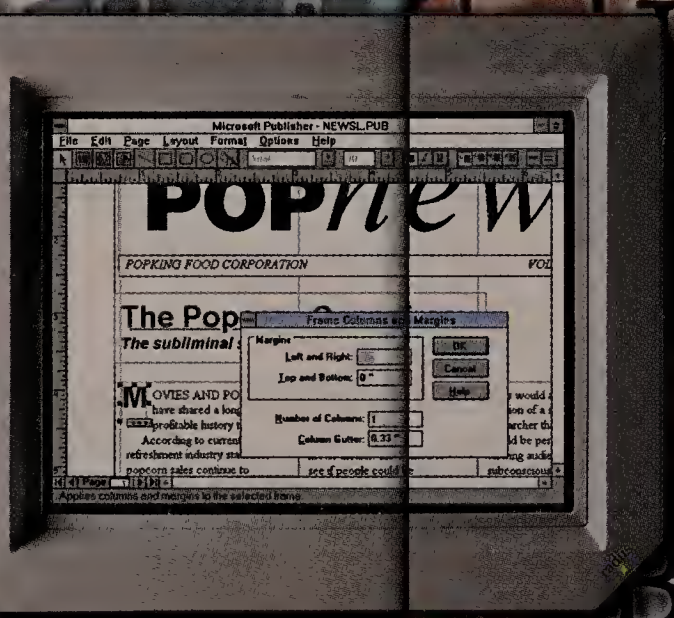
So at Microsoft, we're doing the most we can to help.

It's like having 1500 good friends in the software business. Or like you're sitting conveniently close to the smartest kids in class. And you get to copy their notes.

Microsoft
Making it easier

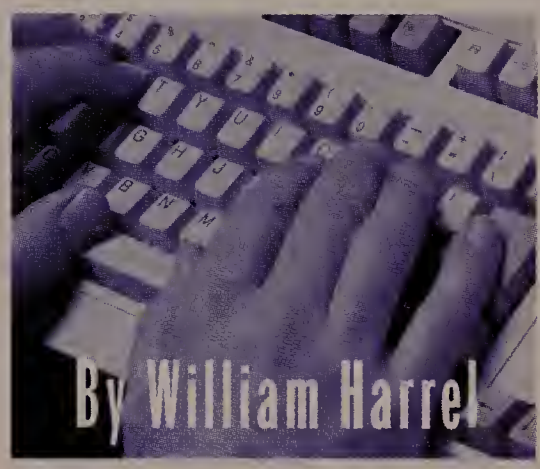
© 1993 Microsoft Corp. All rights reserved. Printed in the USA. Microsoft is a registered trademark and Windows is a trademark of Microsoft Corp.

When looking for the best tool for creating business documents, we thought Windows word processors would d
low-end desktop pu
packages. We were
Here's how they sta



When looking for the best tool for creating business documents, we thought Windows word processors would demolish low-end desktop publishing packages. We were wrong. Here's how they stack up.

WORD PROCESSOR OR DESKTOP PUBLISHER?



By William Harrel

If you're a *Windows* user, you already have a word processor—probably *Microsoft Word for Windows, Ami Pro,* or *WordPerfect for Windows.* These brawny $500 beasts can't be beat when it comes to writing basic documents and printing them on the office laser. But what if you want more? What if you're interested in cranking out slick-looking reports, newsletters, and other documents?

You could plunk down an additional $700 to $900 and get a high-end desktop publishing package such as *PageMaker, Ventura Publisher, QuarkXPress,* or *FrameMaker.* If you're in the publishing business, this is the only way to go. Most of us aren't, however; we're standard business users and our needs are simpler. Luckily we have two reasonable alternatives.

Option one is to pick up a low-cost desktop publishing package. While these DTP programs can't match their high-powered cousins for sheer precision, long-document management, or color prepress tools, they're far easier to learn and use, and they require a fraction of the design talent. It doesn't hurt that they cost a mere $100 to $150 on the street, either.

But before you reach for your wallet, take a good look at option two: your *Windows* word processor. It might just have the page layout tools you need. Most graphical word crunchers let you create frames on each page and fill them with text and graphics, draw lines and boxes, add shading and even color—all in a WYSIWYG display for easy editing. With all that built-in design power, do you really need a desktop publishing program?

To answer that question, we pitted three best-selling low-end DTP packages against a trio of top-flight *Windows* word processors. In one corner, we put *Microsoft Publisher 1.0*, Timeworks' *Publish It for Windows 3.0*, and Power Up Software's *Express Publisher for Windows 1.0*. In the opposite corner sat the word processing heavyweights: Lotus's *Ami Pro 3.0*, *Microsoft Word for Windows 2.0*, and *WordPerfect 5.2 for Windows*.

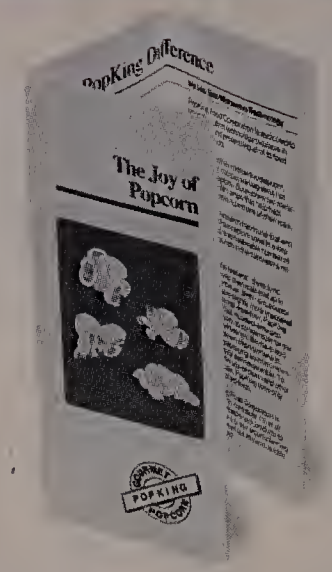
The terms of our slugfest were simple. Pulling *Ventura Publisher 4.1* from our professional tool kit, we designed three of the most common desktop documents—a brochure, a newsletter, and a business proposal—for a fictional small business called PopKing Food Corporation. Then we tried to reproduce each document in all six test applications. Because we wanted to push these programs to their limits, our designs are a tad more sophisticated than the average user might create, incorporating such elements as shaded and rotated type, layered frames, and complex text wraps.

We were looking to answer three questions: Could the program complete the layout? How easy was it to do? And is one type of program better than the other for producing a particular kind of document?

Frankly, we thought the word processors would cream the DTPers, but the page layout programs proved surprisingly feisty. Of our three WP heavies, only *Ami Pro* was able to handle almost everything we threw at it. *WordPerfect* and *WinWord* performed most of the tasks, but only after a lot of work-arounds and hand-holding by support technicians. The DTP programs turned out to be friendlier hands-down—especially when creating short, relatively complex documents like the brochure and newsletter. The publishers hit the ropes, though, when we forced them to prepare the longer, text-intensive business proposal.

The bottom line: None of these applications are ideal for producing every type of document. You'll still need a word processor to create most of your text files, but a low-end DTP package will definitely make some layout chores easier. The key is knowing what kind of documents you need to produce—and how fancy you want to get. What follows is a blow-by-blow account of how our contestants fared, noting the highlights and limitations of each—good things to keep in mind when it's time to create your own designs.

BROCHURE



How They Rate

Word processors: Barring minor snags, all the contenders held their own. *WinWord* had trouble with our EPS graphics; *WordPerfect* couldn't rotate TrueType fonts; *Ami Pro* shone.

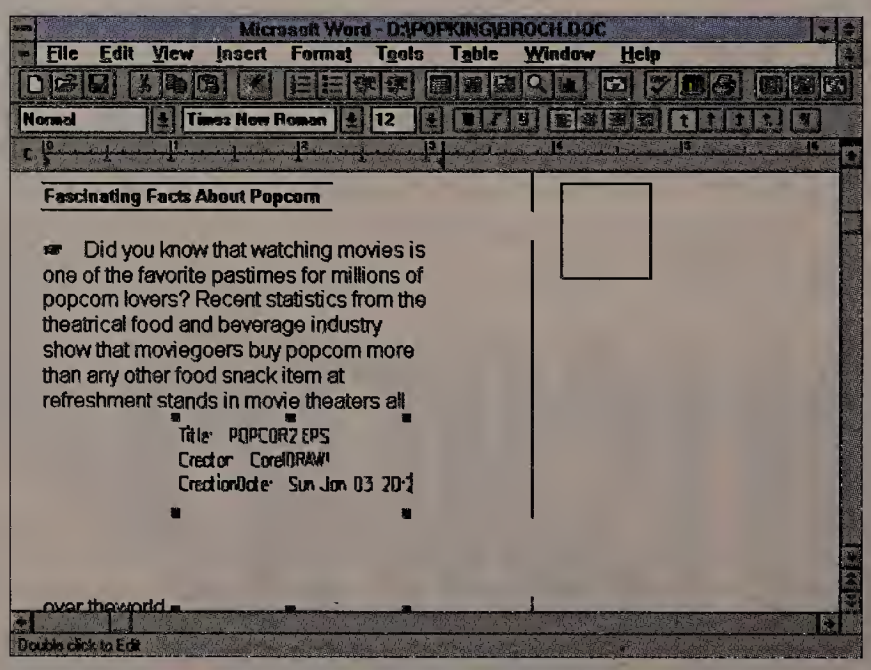
Ami Pro ★★★½
Microsoft Word for Windows ★★★
WordPerfect for Windows ★★½

DTP programs: *Express Publisher* couldn't perform irregular text wraps (though the next version should), and *Microsoft Publisher* balked at importing our EPS images, but mostly the low-end DTP programs proved to be ideal for this type of layout.

Publish It ★★★★
Express Publisher ★★★½
Microsoft Publisher ★★★

The Joy of Popcorn is a typical example of a marketing brochure. It's printed in landscape orientation on both sides of an 8½-by-11-inch page, then folded into thirds, so the front panel becomes the cover and the back panel contains space for an address label. The other four panels contain text and high-quality EPS graphics—popcorn kernels, bags of popcorn, and the PopKing logo—created in *CorelDraw*. The brochure also employs two design elements that proved especially challenging to several programs: We used an irregular text wrap to flow the text along the edge of each graphic; we also placed the return address and logo inside a box on the back panel, then rotated them 90 degrees. We used TrueType Arial and Times New Roman fonts wherever possible. When a feature, such as *Publish It*'s PowerText, worked only with Type 1 fonts, we substituted Helvetica and Times and used *Adobe Type Manager*.

Low-cost page layout packages excel at brochures and other short, design-intensive documents, thanks to features like column guides, extensive drawing tools, and the capability to layer frames. While *Ami Pro* did a good job overall, the other two word processors came up short. Of the six contestants, only *Publish It* was able to easily flow text around irregularly shaped graphics. The other programs provided only blocky, squared-off text wraps. And three programs—*Word for Windows*, *WordPerfect for Windows*, and *Microsoft Publisher*—choked on some of our popcorn graphics. None of these three can accept *CorelDraw* EPS files that contain an image header (a bit-mapped version of the graphic that lets you see the image on screen). We had to export the files to an EPS format without image headers, which made placing and sizing the graphics on screen much tougher.



WORD FOR WINDOWS, Microsoft Publisher, and WordPerfect for Windows all had problems digesting some of our EPS graphics.

Ami Pro

Of the three word processors, *Ami Pro* gives you the most publishing power. It even provides column guides, which make it easy for you to draw frames with the mouse and line them up on the page, plus a column balance feature that aligns text frames at the top and bottom of the page automatically. The only thing that had us

stumped momentarily was figuring out how to rotate text—you need to use *Ami Pro*'s drawing tool.

Microsoft Word for Windows

While *WinWord* lets you draw frames, it has no column guides. You're stuck lining up the frames using the ruler or specifying page coordinates inside a dialog box—which entails a lot of trial and error. Aside from *Word for Windows'* troubles with our EPS graphics, the layout went fairly smoothly. The only way to rotate the return address, however, was by using WordArt, a special effects utility that ships with *WinWord*. Since WordArt uses bit-mapped fonts instead of *Windows'* TrueType outlines, print quality was poor.

WordPerfect for Windows

Overall, *WordPerfect* did a respectable job with the brochure, but didn't make the job easy. Instead of frames, *WordPerfect* uses several different types of "boxes"—text boxes, graphics boxes, and so on—a holdover from its DOS forebear. There's no way to draw a box with your mouse; you have to type in the box's size and coordinates and, if you make a mistake, resize and place it with your mouse. But *WordPerfect* really fell on its face when it came to creating the return address on the brochure's back panel. When we tried to rotate the return address using TrueType fonts, the text refused to turn and printed outside of the box where we'd placed it. Adobe Type 1 fonts, on the other hand, rotated just fine.

Express Publisher

In this case, no news is good news. *Express Publisher* imported the EPS graphics cleanly and rotated the return address perfectly. Our trial turned up just one flaw: *Express* lacks an irregular text wrap feature. We should always have such problems.

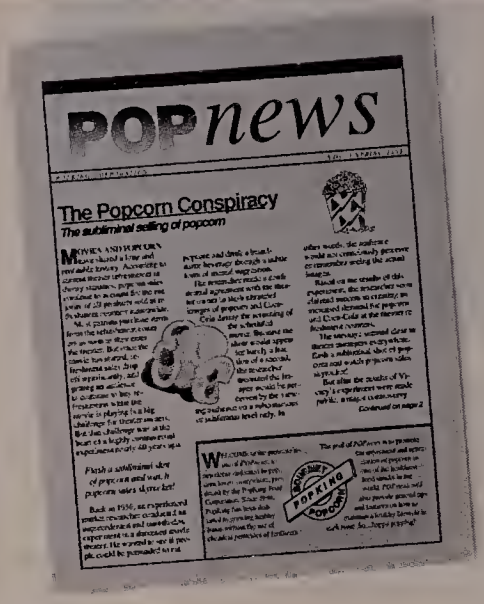
Publish It for Windows

Publish It sailed through the brochure with ease—it's the only product here that lets you contour text easily around irregularly shaped graphics. The only snag showed itself when we tried to rotate the return address—you need the program's PowerText add-on, which requires *Adobe Type Manager*. If you use only TrueType, you can't rotate type in *Publish It*.

Microsoft Publisher

Publisher did a fine job with most of the brochure. But because it uses the same file import filters as *WinWord*, it can't accept EPS files containing image headers, which meant the only sure way to check graphics placement was by printing drafts. And, like *WinWord*, *Publisher* relies on WordArt for rotating text—not a workable alternative.

NEWSLETTER



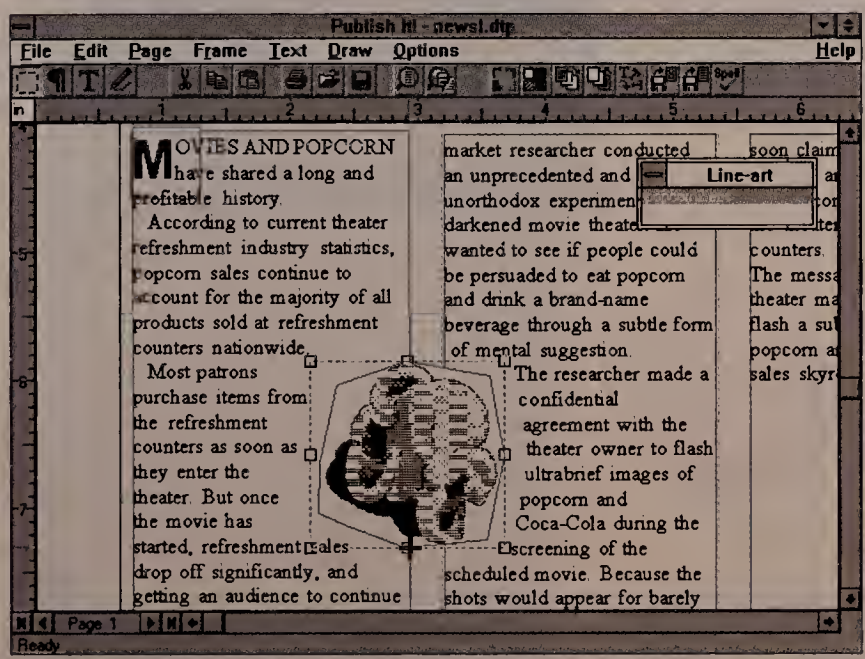
How They Rate

Word processors: Except for *Ami Pro*, the intricate layout features of our newsletter proved too taxing for the word processors. We weren't able to complete it in either *Word for Windows* or *WordPerfect for Windows*.

Ami Pro ★★★½
Microsoft Word for Windows ★★
WordPerfect for Windows ★½

DTP programs: While the DTP programs didn't include every feature we needed, their overall page layout orientation made creating the newsletter easier.

Microsoft Publisher ★★★½
Express Publisher ★★★
Publish It ★★★



TIMEWORKS' PUBLISH IT WRAPS TEXT AROUND GRAPHICS of any shape and lets you adjust the bounding box that surrounds the image.

Creating a newsletter is invariably harder than it looks, and this example was no exception. Of our three sample documents, the four-page *POPnews* features the most difficult collection of design elements. The front page contains a band of reversed type across the top and a banner with 127-point type. The letters "POP" in the banner are screened at 30 percent black, which makes them appear gray, and the space between the letters in "news" has been increased to spread them across the page. The first paragraph of each story begins with a 24-point letter inset into the text (a "drop cap"). Two EPS popcorn graphics and the PopKing logo are placed in the text with an irregular text wrap around them.

Other tricky design elements include a display quote near the bottom of the first column on page 1, a jumpline ("Continued on page 2") at the end of the third column, and a two-column sidebar in a shaded box in the bottom-right corner.

To complicate things further, the page features a hairline border. With most of the programs this required us to draw one large frame and lay several smaller text and graphics frames on top of it—a task that brought some applications to their knees. Another key newsletter feature we tested for is frame linking, or the ability to flow text between nonconsecutive pages, from, say, page 1 to page 4.

If you're creating a long or fairly sophisticated newsletter, save yourself some aggravation and buy a low-cost page layout program. All the desktop publishers here have one essential feature needed for newsletters—frame linking. Not one of the word processors does, which means the only way to jump text from one frame to another is by cutting and pasting—a major hassle if you need to select all the text in a specific story or make revisions. Except for its frame linking deficiency, *Ami* proved the most capable for laying out the newsletter, with *Microsoft Publisher* a close second.

Finely-Tuned Orchestrated Solutions...

It takes more than just great computers to meet the information management needs of today's businesses. It takes talented people who have the ability to orchestrate solutions using the finest products and services available. And that's precisely what you get when you choose Northgate.

Here are just a few examples of the hardware platforms that await you. Keep in mind that we'll configure your systems any way you like. And back them with service and support that was just named "Readers' Choice" by *PC Magazine*. Take a look, then call Northgate today.

Northgate® ZXPortable™
- 80486SX/25MHz or DX/25MHz processor
- 120MB hard drive (200MB available)
- 4MB RAM (expands to 16MB)
- VGA monochrome with 64 shades of gray or Active Matrix Color display with 256 simultaneous colors
- 86-key full-travel keyboard
- Nickel metal-hydride battery for up to 4 hours of power (3 hours color)
- 8.5" x 11" size
- Monochrome weighs 6.2 lbs.; color 6.4 lbs.
- MS-DOS 6.0 and Windows™ 3.1
- Logitech™ TrackMan Portable mouse
- Fabric carrying case
- Free $395 value PackRat PIM/contact management software

ZXPortable 486SX/25
Monochrome **$1899** Color **$3599**

ZXPortable 486DX/25
Monochrome **$2099** Color **$3799**

Optional Docking Station $599

Docking Station Bundle with 14" SVGA color monitor, *OmniKey* keyboard, 1.2MB floppy drive and desktop mouse **$999**

Northgate 486-VL
- 80486SX/25 processor
- Upgradable to OverDrive™ processors
- Two bus-master VESA local bus slots
- Local bus video with 1MB RAM
- 128K cache
- 4MB RAM (expands to 64MB)
- 100MB hard drive
- Space-saving case (tower available)
- 1.2MB or 1.44MB floppy drive
- Northgate 15" non-interlaced SVGA color monitor
- 101-S keyboard

$1749 (Lease as low as $62.86/mo.)*

As configured above with 80486DX/33 processor **$1999** (Lease as low as $73.96/mo.)*

As configured above with 80486DX2/66 processor **$2449** (Lease as low as $90.61/mo.)*

SlimLine® 486 ZXP-L
- 80486SX/25 processor
- Upgradable to i486™ processors and OverDrives
- 1MB local bus video
- Virtual cache
- 4MB RAM (expands to 128MB)
- 100MB hard drive
- Space-saving SlimLine case
- 1.2MB or 1.44MB floppy drive
- Northgate 14" non-interlaced SVGA color monitor
- 101-S keyboard

$1499 (Lease as low as $55.46/mo.)*

Configured as shown with 80486DX/33 processor **$1749** (Lease as low as $62.79/mo.)*

Configured as shown with 80486DX2/66 processor **$2199** (Lease as low as $81.36/mo.)*

Elegance 486 ZXP EISA VESA
- 80486DX/33 processor
- Upgradable to other i486 processors and OverDrives
- Eight 32-bit expansion slots
- 128K cache (256K available)
- 8MB RAM (expands to 256MB)
- 240MB IDE hard drive
- Space-saving case
- 1.2MB or 1.44MB floppy drive
- Accelerated™ Windows video with 1MB RAM
- Northgate 15" non-interlaced SVGA color monitor
- 101-S keyboard

$2999 (Lease as low as $102.57/mo.)*

As configured above with 80486DX/50 processor **$3349** (Lease as low as $114.54/mo.)*

As configured above with 80486DX2/66 processor **$3449** (Lease as low as $117.96/mo.)*

Elegance 486 ZXP
- 80486SX/25 processor
- Upgradable to i486 processors and OverDrives
- 64K cache
- 4MB RAM (expands to 32MB)
- 100MB hard drive
- Space-saving case (tower available)
- 1.2MB or 1.44MB floppy drive
- Northgate 14" non-interlaced SVGA color monitor
- 101-S keyboard

$1599 (Lease as low as $59.16/mo.)*

As configured above with 80486DX/33 processor **$1849** (Lease as low as $66.38/mo.)*

As configured above with 80486DX2/66 processor and Tower case **$2299** (Lease as low as $85.06/mo.)*

At Prices That Will Make You Applaud.

Northgate OmniLAN Systems
Northgate offers a variety of "plug and play" network solutions for up to hundreds of users. Here is just *one* example.

Novell® Server
- Elegance™ ZXP 486DX/50 EISA
- 16MB RAM
- Adaptec 1740 SCSI controller
- 525MB hard drive
- 1.44MB floppy drive
- Intel Ethernet Express 32-bit Thinnet interface card
- VGA video adapter
- 14" VGA monochrome monitor
- 101-S keyboard
- FREE installation of Novell NetWare with NetWare purchase

$4649 (Lease as low as $154.35/mo.)*

Power Workstation
- SlimLine ZXP 486SX/25
- 4MB RAM
- 240MB hard drive
- 1.44MB and 1.2MB floppy drives
- Local bus VGA with 1MB RAM
- Intel Ethernet Express 16-bit Thinnet card
- 14" SVGA color monitor
- 101-S keyboard

$1749 (Lease as low as $62.79/mo.)*

Advanced Application Workstation
- Elegance ZXP 486DX2/66
- 8MB RAM
- 240MB IDE hard drive
- 1.44MB and 1.2MB floppy drives Accelerated Windows video with 1MB RAM
- Intel Ethernet Express 16-bit Thinnet card
- 14" SVGA color monitor
- 101-S keyboard

$2999 (Lease as low as $102.57/mo.)*

Northgate Server Array
- 486DX2/66 EISA motherboard with 16MB RAM (expands to 128MB)
- Single SCSI channel; expandable to 3 and 5 channels
- EISA bus master with 33MB burst mode transfers
- 4MB cache controller; expands to 64MB
- 560MB base storage; expands to 10GB
- RAID levels 0, 1 and 5
- Hot-sparing and background data rebuild for zero downtime
- Three independent power supplies with redundancy
- 14" SVGA monochrome monitor
- Northgate 101-S keyboard
- Novell certified device drivers and utilities for NetWare™ 3.11
- Vertical case
- Five year limited warranty

$8699 (Lease as low as $280.98/mo.)*

Northgate External Disk Array
- 560MB base storage; 60GB maximum with 5 channel array
- Single SCSI channel; expandable to 3 and 5 channels
- EISA bus master with 33MB burst mode transfers
- 4MB cache controller; expands to 64MB
- RAID levels 0, 1 and 5
- i960-based RAID controller and cabling to connect the array to the server
- Hot-sparing and background data rebuild for zero downtime
- Three independent power supplies
- Novell certified device drivers and utilities for NetWare™ 3.11
- Vertical case
- Five year limited warranty

$4599 (Lease as low as $152.69/mo.)*

Award-Winning Northgate *OmniKey*™ Keyboards
- Choose 101NI with 12 F-keys on top; 102 with 12 F-keys on left or ULTRA with 12 F-keys on top and left
- Alps™ click/tactile key switches
- Independent inverted "T" cursor control and numeric keypads
- Limited dexterity features
- Rate select from 3-120 CPS
- Interchangeable CRTL, ALT, CAPS LOCK keys
- *OmniKey* utility disk
- Unmatched IBM® compatibility
- FCC Class B certified

OmniKey/101NI or 102
ONLY $89
OmniKey/ULTRA-T
ONLY $129

Call For More Information
800-453-0128

GSA #GS00K91AGS5193 PS01

Major credit cards, money orders, direct wire and approved company purchase orders accepted.

NORTHGATE®
Solutions for Workgroups™
7075 Flying Cloud Drive, Eden Prairie, MN 55344

©Copyright Northgate Computer Systems, Inc. 1993. All rights reserved. Northgate and ZXPortable are U.S. trademarks or registered U.S. trademarks of Northgate Computer Systems. i486SX and the Intel Inside logo are U.S. trademarks of Intel. All other products and brand names are U.S. trademarks and registered U.S. trademarks of their respective companies. Prices shown are in U.S. dollars and do not include shipping/handling charges or appropriate sales taxes. Offer valid in the U.S. and Canada only. Prices and specifications subject to change without notice. Northgate reserves the right to substitute components of equal or greater quality or performance. All items subject to availability.

Ami Pro

Ami is the only word processor with a page-border tool, making our chores much easier. Its Send to Back and Bring to Front commands allowed us to layer frames and then shuffle their order, which proved invaluable when creating the sidebar and placing the logo inside it. If only *Ami* could do irregular text wraps and link frames, we would have been thrilled.

Word for Windows

This newsletter proved a tad too complex for *WinWord*. The only way we were able to create the page border, for example, was to use an obscure macro and output to a PostScript printer. To create the gray text in the *POPnews* banner, we had to specify it as a color, which *Windows'* printer drivers convert to a gray shade on black-and-white printers. In order to draw two columns in the sidebar frame, we had to call Microsoft technical support, who told us to create the columns first and then frame them. Even then, there was no easy way to wrap the sidebar text around the edge of the PopKing logo. At that point we gave up.

WordPerfect for Windows

To lay out a document this sophisticated in *WordPerfect for Windows* you'll need an intimate knowledge of *WordPerfect*'s formatting codes and a large bottle of aspirin. For instance: The only foolproof way to create a page border is to define a page-size user box in a header—who would ever think of that? *WordPerfect* also falls short in its handling of text and graphics boxes. When we tried to layer a small box on top of a larger one, we couldn't use the mouse to select or move the small box. Instead, we had to leave the editing window and plod through cumbersome dialog boxes. The process got worse from there.

Express Publisher

Express Publisher gave us only minor hassles. The program allows only one column per frame, and each frame must have the same size rules on all four sides. Since the *POPnews* sidebar has multiple columns, a 6-point rule at the top, and a hairline rule on the left, we had to draw five frames. Graphics created with *Express Publisher*'s drawing tools require their own frame; if you draw a line under some text and then move the text, the line won't come along with it. Finally, the Undo command is limited to moving (or unmoving) objects. With a trial-and-error venture like page layout, you really need more.

Publish It for Windows

Publish It for Windows, on the other hand, has no Undo command at all. Still, laying out the newsletter was simple, with a few small exceptions. To tint the text in the banner requires PowerText, which uses only *ATM* fonts. And there is no way to select text across linked frames—Timeworks sorely needs to add a Select Entire Story command to *Publish It*.

Microsoft Publisher

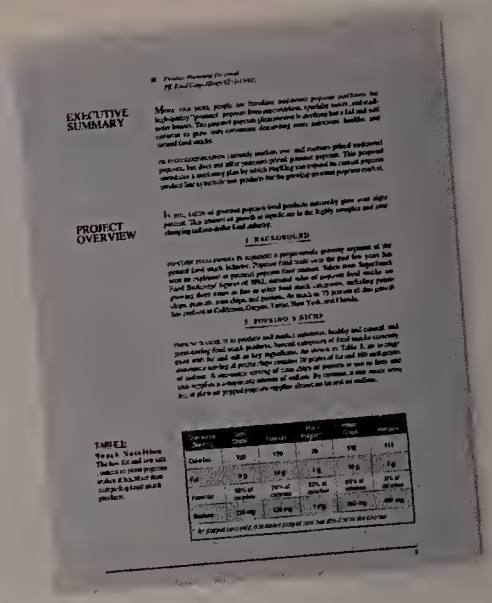
Next to *Ami Pro*, *Microsoft Publisher* did the best job on our newsletter. We had the same problem with the EPS graphics as in the brochure, and we had to use WordArt to tint the headline text, but otherwise our document came together faster than it did with any other program.

More on the Way

Technology never stands still. While we were preparing this article, Microsoft Corporation was working on upgrades to both *Word for Windows* and *Publisher* and WordPerfect Corporation was laying the groundwork for *WordPerfect for Windows 6.0*. According to Microsoft, *Publisher* will sport several new features addressing some of the more egregious problems we encountered. Apparently the next version will include style sheets, better all-around long-document handling, a table editor, improved irregular text wrap, and TrueType support for its WordArt miniapplication.

On the word processing front, WordPerfect should be releasing *WordPerfect for Windows 6.0* sometime in late 1993. And rumors of a release later this year of Microsoft's *Word for Windows* have also been circulating. Neither company is discussing potential features just yet, but we feel safe in predicting that *WordPerfect* will sport better frame handling and TrueType support. And since *Word for Windows* uses the same WordArt module as *Publisher*, the next version of *Word* will have better text rotation capabilities.

BUSINESS PROPOSAL



How They Rate

Word processors: Overall, the word processors were much more adept at handling long documents than the low-end publishing programs.

WordPerfect for Windows ★★★★
Ami Pro ★★★½
Microsoft Word for Windows ★★★

DTP programs: As a rule, the low-end DTP programs lacked long-document prowess.

Express Publisher ★★½
Publish It ★★½
Microsoft Publisher ★★

The PopKing marketing proposal shown here tested each program's long-document handling capabilities, such as page numbering, headers and footers, and style sheets. It consists of a cover sheet and 11 two-column pages: a two-inch column on the left for headings and captions, and a four-inch column on the right for body text. Embedded throughout the body text are spreadsheet charts and graphs. In this type of document, figures and graphics can change often, and you'll need to be able to update them easily as the data changes. This put our programs' Object Linking and Embedding (OLE) capabilities to the test.

Compared to the newsletter, the proposal's design is simple: It doesn't contain any layered frames, EPS files, or text wraps, and it relies heavily on paragraph styles and the software's ability to anchor graphic frames to text. The short-and-sweet conclusion here is that it's easiest to produce this sort of document using a word processor—particularly *WordPerfect*. The paragraph style controls in our three word processors are far more sophisticated than those found in low-end

page layout programs, and all three let you create tables and set up OLE links. On the DTP side, only *Microsoft Publisher* supports tables and OLE, but its lack of style sheets makes it unsuitable for long documents. And none of the DTP packages can anchor frames to paragraphs: Every time we made a change or brought in a graphic, it made drastic changes to our layout.

Ami Pro

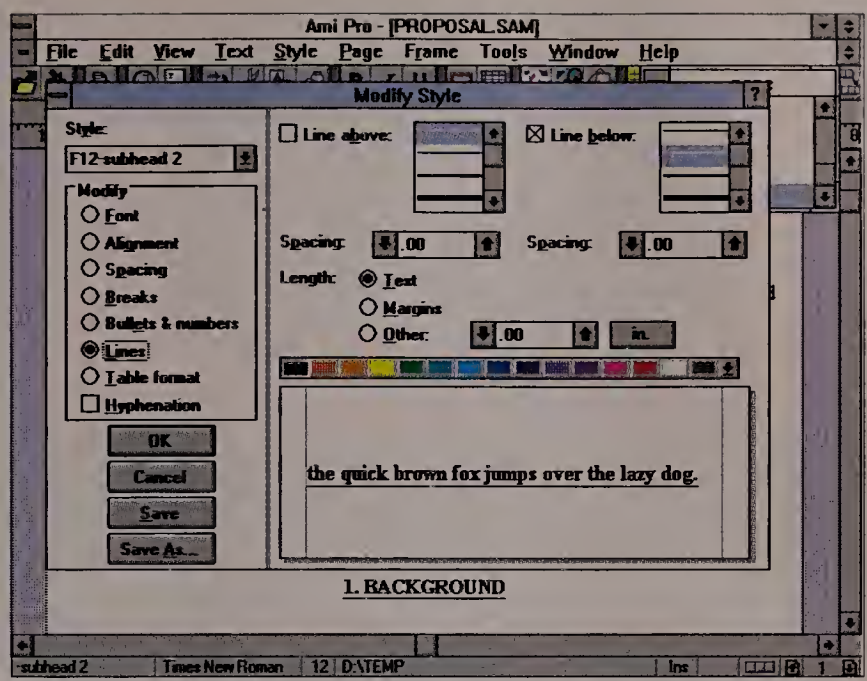
While *Ami Pro* had no real problems with the proposal, it didn't make the layout exceptionally easy either. As with the DTP programs, we poured body text into a column on the right, headings and captions into the frames on the left. *Ami Pro* let us anchor frames to paragraphs, which meant importing graphics and doing revisions didn't wreak havoc on our frame placement.

Microsoft Word for Windows

It took us several phone calls to Microsoft's tech support to figure out how to create this document in *WinWord*. At first, the frames seemed to move around by themselves, and text jumped out of frames when we applied paragraph styles to it. Microsoft told us to create a column for the body text on the right side of the page, to create frames for headings and captions in the left margin, and to define the frames as part of the paragraph's style. That worked, but we would never have figured it out on our own.

WordPerfect for Windows

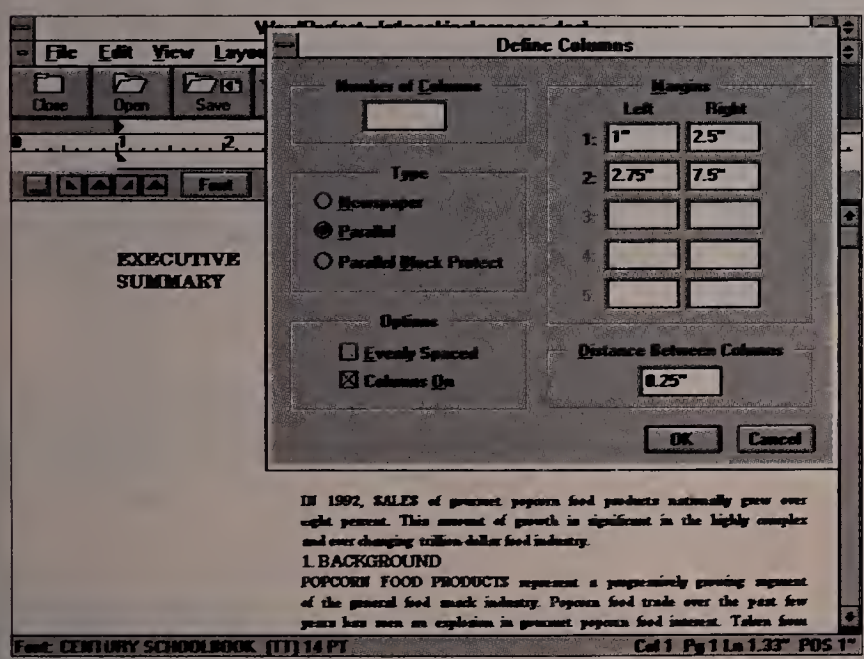
WordPerfect did the best job here. Using its parallel columns option, we were able to create headings and captions in one text column, body text in another—we didn't use frames at all. Parallel columns act like tables: No matter how we edited the body text, the headings moved appropriately. To format the doeument, all we did was apply styles on each page, type captions, and embed our charts and graphs.



AMI PRO LET US DEFINE THE LINES below the section headings as part of their paragraph styles, a feature none of the DTP programs support.

Express Publisher

Express Publisher doesn't support OLE, but it does have a proprietary option for updating graphics and text files that works reasonably well. However, *Express*'s master page tool, which lets you specify design elements such as rules and headers that usually appear on every page of a document, will not let you hide certain elements for specific pages in the proposal. Because the report's cover sheet doesn't have a header or a page number, we had to treat the cover as a separate document with its own master page—an awkward fix.



WORDPERFECT'S PARALLEL COLUMNS FEATURE made laying out the proposal a snap. Other programs required us to create separate frames for the headings and captions.

Publish It for Windows

Publish It also lacks support for OLE—but unlike *Express Publisher*, it provides no proprietary alternatives. Otherwise it does a reasonable job of laying out the report. We did uncover a small hitch, though: *Publish It* doesn't support small caps, which are capital letters set at the x-height of standard lowercase letters. Small caps appear in several places in the proposal.

Microsoft Publisher

Microsoft Publisher has some of the tools necessary for creating long documents, such as OLE and table support, but lacks one crucial feature: style sheets. Style sheets let you format big chunks of text at once—a necessity for long documents. *Publisher* forced us to format every paragraph manually, which made the process three or four times longer than it should have been.

William Harrel is a writer and desktop publisher based in Weaverville, California. He has written four books on desktop publishing, including one on Aldus PageMaker *and two on* Ventura Publisher.

WHERE TO BUY

Ami Pro 3.0
List price: $495
Lotus Development Corp.
800/343-5414,
617/693-3899 (fax)
Reader service no. 716

Microsoft Word for Windows 2.0
List price: $495
Microsoft Corp.
800/426-9400,
206/635-6100 (fax)
Reader service no. 717

WordPerfect 5.2 for Windows
List price: $495
WordPerfect Corp.
800/451-5151,
801/222-5077 (fax)
Reader service no. 718

Express Publisher for Windows 1.0
List price: $149.95
Power Up Software
415/345-0551,
415/345-5575 (fax)
Reader service no. 719

Publish It for Windows 1.0
List price: $149.95
Timeworks
708/559-1300,
708/559-1399 (fax)
Reader service no. 720

Microsoft Publisher 1.0
List price: $199
Microsoft Corp.
800/426-9400,
206/635-6100 (fax)
Reader service no. 721

STRENGTH IN

Let's face it. In today's competitive business environment, the strongest organizations are the ones that effectively share information. At Acer, we call this strength in numbers.

Acer provides powerful solutions, tying together desktop systems with powerful information servers through a range of products spanning from low-cost servers to complete UNIX®-based client/server systems.

Founded in 1976, Acer—a multinational company with 1992 sales of $1.2 billion—manufactures a broad range of products designed to meet corporate America's computing needs. For the corporate UNIX environment, Acer delivers the strongest price/performance in the industry, offering the power of midrange systems at microcomputer pricing.

Acer continually pushes the envelope of functionality and price/performance, enabling you to derive the greatest strength from your available numbers.

NUMBERS

AcerFrame 500

The AcerFrame™ 500 provides a low-cost hardware platform fully compatible with off-the-shelf operating systems and network environments from partners like Novell®, Microsoft®, Banyan®, IBM® and SCO®. The AcerFrame 500 is an entry level EISA server at the price point of an ISA server.

ChipUp™ technology allows processor upgrades to 486DX2/66 today and will be compatible with future generations of Intel® microprocessors. And on-board memory, expandable to 64MB using non-proprietary SIMMs, adds to the AcerFrame 500's flexibility. But we've added more than flexibility—we've also added security. Eleven levels of software, hardware and mechanical security features add extra protection to your network.

Specification Summary

Intel 486DX/33 ChipUp to 486DX2/66

4MB to 64M8 RAM

5 EISA and 2 ISA expansion slots, 1 local bus slot

Six 5 1/4" and one 3 1/2" storage bays

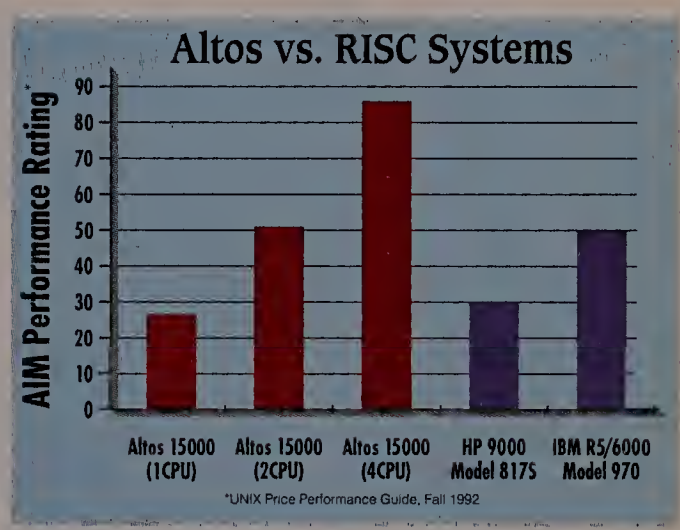
Optional graphics accelerator delivers 28+ WinMarks™

Altos System 15000

The Altos® System 15000 is a fully integrated solution that outperforms all leading RISC-based systems at the price point of a PC server. The Altos solution meets the performance and reliability demands of the most business-critical environments.

This symmetric multiprocessing system provides one to four Intel 486DX CPUs at 50MHz. Multi-threaded I/O and networking allow maximum multiprocessing scalability. And the Altos System 15000 is 100% SCO compatible, giving you the widest selection of available applications. All Altos products are backed by the Acer worldwide service and support organization.

The benefits of an open systems environment are greatly enhanced by quality software. Highly optimized I/O controllers in the Altos System 15000 are complemented by key extensions to SCO UNIX and MPX, together with desktop integration through Altos NetWare™ for SCO UNIX Systems.



Some of the Altos software solutions include:

- Altos NetWare for SCO UNIX Systems—perfect for integrating SCO UNIX or Altos systems with a Novell PC LAN
- Value-added enhancements to SCO UNIX for our single and multiprocessor servers
- Breakthrough desktop integration for PCs through Altos NetWare for SCO UNIX Systems and Altos APEX™ for Windows—a powerful Windows-to-UNIX integration solution
- Advanced system software for client/server computing environments

Acer®

ONLY THE STRONG SURVIVE

Call 1-800-SEE ACER for a distributor or reseller near you

Altos is a registered trademark and AcerFrame, Altos APEX, and ChipUp are trademarks of Acer, Inc. i486 and the Intel Inside Logo are trademarks of Intel Corporation. All other trademarks are the property of their respective owners. ©1993 Acer, Inc.

Circle 3 on reader service card

DATABASES Come to Windows

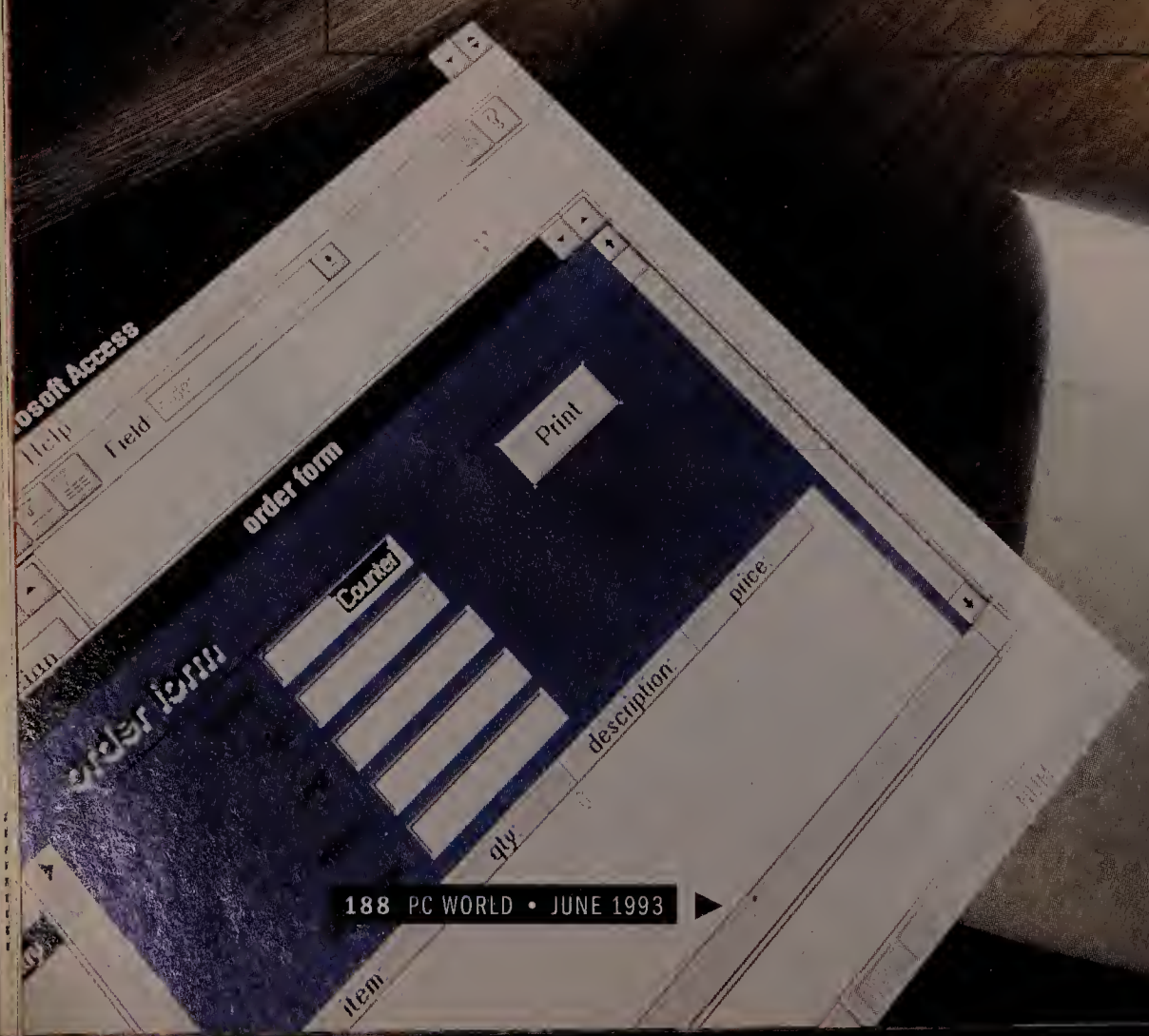
The claim of new Windows database programs: to make managing information a point-and-click affair. Do they succeed? We test seven packages—for novices and pros—to find out.

At last—after years of drought in *Windows* database land, the software showers have started, and now a number of *Windows* database managers are on the market. This is great news for all *Windows* users and might finally tempt hard-core DOS fans to make the big switch. We jumped right in to evaluate these new programs and see if the wait was really [illegible]

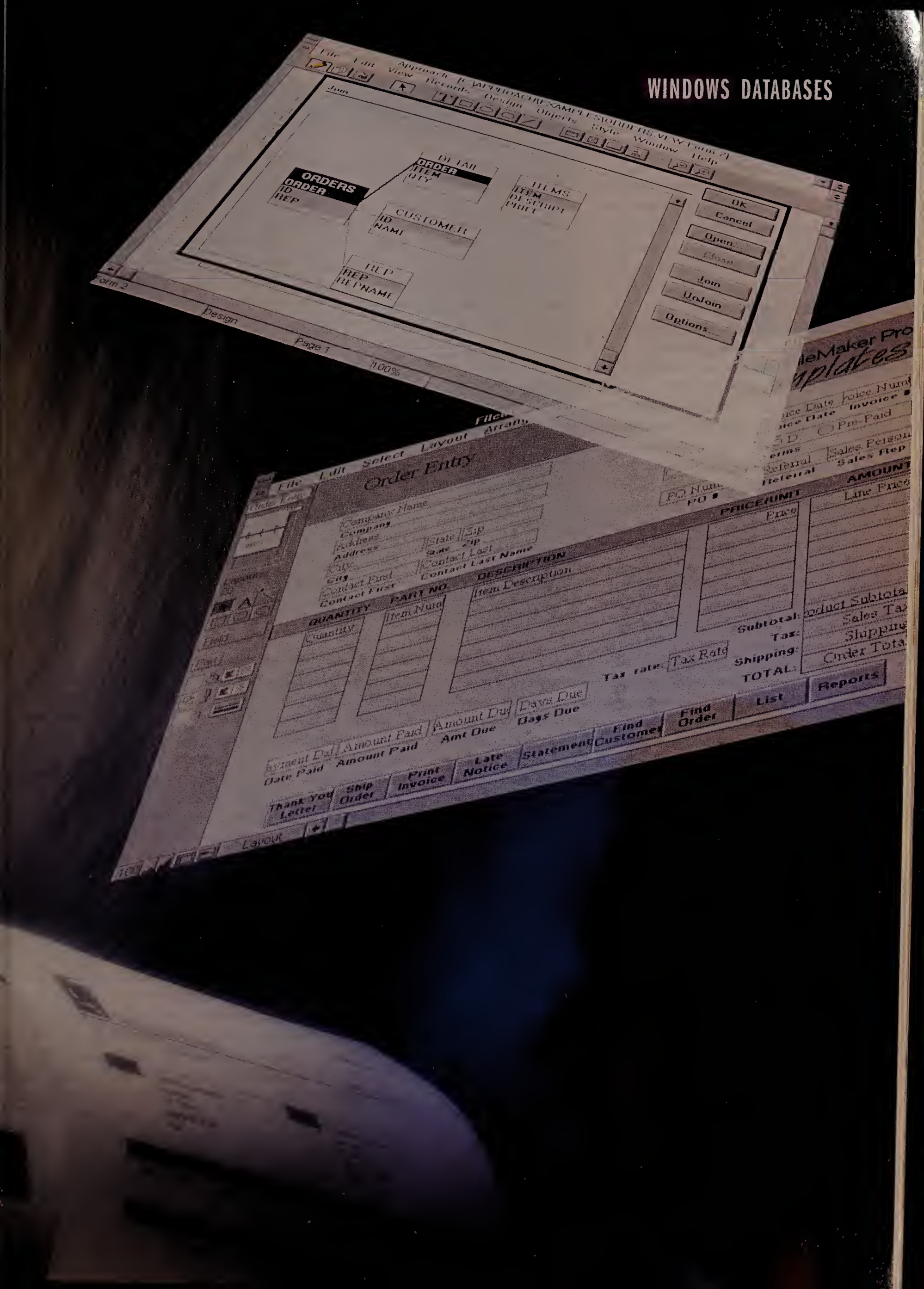
While these programs address a variety of database tasks, they all claim one common feature: ease of use. *FileMaker Pro* and *AceFile* provide simple database management. *DataEase Express* and *Approach* try to blend application development and high-level capabilities while avoiding programming. And the most sophisticated of these programs, *Superbase, Access,* and *Paradox for Windows,* besides claiming simplicity for the end user, are fully featured and make programming easier than ever. To help you separate this spectrum of complexity, we've ordered the reviews in this roundup from simplest product to most complex.

We chose to look at software that had been released recently.

BY CELESTE ROBINSON



WINDOWS DATABASES

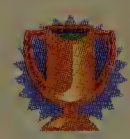


We didn't include *WindowBase* because its new version was not yet available and we felt it wouldn't be fair to compare it to the newer products here. We also didn't include three other products because they're primarily for developers: Two of them, Microsoft's *FoxPro for Windows* and Computer Associates' *dBFast*, have been available for some time, while Borland's *dBASE for Windows* has not yet shipped. We'll provide more information about these other *Windows* data managers in future issues.

Let's lay some groundwork: The products we tested represent a wide range of database capabilities. Nonrelational database managers allow easy management of simply structured data (for example, what you could put in a table) that's contained in a single file. Relational database managers allow you to create and store different categories of information in separate files and then link or relate information between the files. Nonprogrammable database managers let you build applications, but what these applications can do is limited. On the other hand, programmable database managers (and to a lesser extent those in which you can write macros) allow you to create almost any kind of application.

To discover just how good each program is for its intended audience, we tested them using a battery of detailed tasks, from simple to complex, focusing on usability. We also had the PC World Test Center run some straightforward performance tests. But before we get into the results, let's take a look at what distinguishes these new data managers from their DOS-based ancestors.

Best Buys



For simple, nonrelational databases, *FileMaker Pro* earns a Best Buy due to its ease of use and excellent performance. It doesn't support multiple file formats, and you can't use it to graph or cross-tabulate data as with *AceFile*, but for point-and-click simplicity it's a clear winner. *AceFile* did nearly as well overall, and you might want to check it out because of its low price and slightly larger feature set.

With the simplicity of its user interface, its capability to access data in several different file formats directly, and its good performance, *Approach* gets a Best Buy for uncomplicated relational database projects. *Approach* makes it easy to customize data entry. You don't have to write any code or use macros as with most of the more powerful programs. You can point and click to join data files visually to create multitable forms and reports, and there are plenty of built-in macros. *Paradox for Windows* is also pretty good for straightforward, simple relational operations.

BEST BUY APPROACH is the simplest and most straightforward relational database.

It's hard to pick a winner at the high end of this group. The programs are so complex and vary so much in capability that the choice depends on the situation.

We consider *Paradox for Windows* and Access to be the most useful when your project is complex—say, a database system for a large department—and you have only a couple weeks to get it up and running. For really complex database applications involving several linked departments, Access

Is a GUI Worth a Thousand Characters?

Some say appearance and style are everything. These new *Windows* database managers have both and manage to back them up with some real substance. Most notably, they help you easily create good-looking forms and reports. With a couple mouse clicks, you can change the style, font, size, and color of text and data and add graphic elements to your forms and reports. Most of the programs will also let you store sound or video objects in data files.

But the real question is whether the data handling is any good. Does the graphical interface of these new *Windows* products really make it easier to manage data than popular DOS programs like *Q&A* and *Paradox* do? And if so, how?

Chasing the Windows Database Grail

To find out which of these products deserved a Best Buy, we based our tests on a hypothetical work group trying to get its job done using information from a variety of sources. Customer and contact information might come from a local PC, while sales information could be stored as *dBASE* or SQL files on a server. We devised a group of five database challenges of increasing complexity.

We started with the basic building blocks of any database. The first task was to create a table of customer information, add data checks such as making sure each customer ID was numbered sequentially, and test data entry using a plain-vanilla form. This task is straightforward, one that any program should handle. We focused here on ease of use. All the products earned passing grades, but *FileMaker Pro* and *Approach* did best.

The second task involved creating a table of contact/action information related to the customer table from the first task, then using it to make a follow-up report of incomplete action items. This task is more complex, but it's the basic work of a relational database manager. If a program didn't pass, you should consider it only for individual use—keeping track of simple lists and tables of information, such as contacts or an office inventory—and not for anything more complicated.

With the two nonrelational programs, *FileMaker Pro* and *AceFile*, we could create the follow-up report, but we had to settle for a makeshift solution. *FileMaker Pro* can be set up to include a fixed number of repeating fields to hold contact information in each customer record. But once you reach the number of repeating fields you've specified, you're stuck. *AceFile* actually has the capability to relate and join two tables to create a new table, so we were able to get all our customer and contact information into one table for reporting. However, you can suppress only one of the duplicated fields, so the final output included lots of repeated information.

For a more stringent test of the relational programs' power, our next task was to use five tables together for order entry and invoic-

JON LUCICH

ACCESS wins the Best Buy at the high end.

is best when you are short on time. But consider both *Paradox/Win* and *Access* when you have plenty of time, since the features of either in certain areas could outweigh other advantages. We feel obliged to make an overall call here, though, and *Access* just edges out the others for Best Buy, principally because of ease-of-use features like macros. But it's a close finish, and the choice of a high-end database is too important to make lightly. Consider the pros and cons of each program in relation to your needs.

To sum up the merits of the various contenders, *Access* and *DataEase Express for Windows* have the most ease-of-use features for difficult tasks, *Paradox for Windows* is easiest for creating data files and customizing data entry and easier to use on the basic building-block operations of database management, and *Superbase* is the most straightforward in approach and is now in its second *Windows* release. On the downside, *Access* reportedly has bugs (though we didn't see any) when dealing with very large data sets and has a steep learning curve, *DataEase Express* is lacking in high-end functionality and programmability, *Paradox/Win* has problems with some form and report functions, and *Superbase* is not as easy to use as the others.

FILEMAKER PRO is our Best Buy for flat-file data management.

ing. We related tables of customer, sales rep, order, line item, and product information, putting together a multitable form for order entry, then creating a report that could be used to print invoices. If a program can't manage this tougher relational task, then it won't do for building applications designed to integrate and run your business. Neither *FileMaker Pro* nor *AceFile*, with their strictly limited relational capabilities, could complete this task or the next.

Our fourth task was to create a summary report of total sales by salesperson. We had to be able to summarize information across related tables. We could do this with all the relational products, but with varying difficulty. If your business requires different departments to work together, and they all need to provide high-quality reports on their day-to-day operations, the database you choose should be able to handle this fairly tough reporting task.

Each product's approach was unique. *Access*'s Report Wizard feature showed to nice advantage here. The report it created needed to be doctored a bit but required less work than the *Paradox for Windows* report, where the only way to add summary fields was to do it manually. The final result from *DataEase Express for Windows'* Query By Model (QBM) tool was nice, too, in that we could add the summary field by clicking on the right place in the dialog box, but it took some time to figure out which table to use as the master for the report.

Finally, we looked at what it would take to automate the printing of our reports. The idea here was to see how easy it was to create the custom action buttons that are one of the hot new features of these *Windows* databases. Printing a report, however complex, is a standard activity, and it should be easy to set it up to execute with a mouse click. This task was enlightening, as we found that *FileMaker Pro* and *Approach*, two of the nonprogrammable products, let you set up these buttons with a few mouse clicks, while *Superbase* and *Paradox for Windows* required that you write code to attach to the buttons, or at the very least open a programming editor to drop in a canned routine.

The Right Database for You

In this type of roundup we ordinarily try to determine which products deserve a Best Buy based on ease of use, performance, price, and other factors. With these products, however, no one database can be recommended for all users. The best choice depends on the kind of information that you're working with and how sophisticated your data management needs are. The first step should be to figure out just how much database power you need. Here's a breakdown of the possible categories as we see them:

If you need a database just to keep track of phone numbers or some other project where you can keep all your information in one file, an easy-to-use flat-file (nonrelational) program like *FileMaker Pro* or *AceFile* will work for you. If you're not sure a flat-file data manager is enough, look carefully at the unique features of *FileMaker Pro* and *AceFile* that stretch them beyond the typical nonrelational data manager. Also, *FileMaker Pro* has the advantage of working across both the *Windows* and Macintosh environments, while *AceFile* uses the common *dBASE* file format. Or you might consider a more powerful program, like *Approach* or *DataEase Express*, if you think you'll need its capability later or if you're planning to expand its use to other areas of your organization.

Does the graphical interface of these new Windows products really make it easier to manage data than popular DOS programs like Q&A and Paradox do? And if so, how?

For projects like our order entry and invoicing task that definitely require the capability to handle more than one data file at a time, you'll need a relational database. *Approach*, *DataEase Express*, *Superbase*, *Access*, and *Paradox for Windows* all fall into this category. These programs can be divided into two groups: *Approach* and *DataEase Express*, which are not programmable, and *Superbase*, *Access*, and *Paradox for Windows*, which are.

Of the nonprogrammables, *Approach* is the easier to use for projects involving just a few related tables. A good example is if you're

THE KITCHEN SINK IS

If you're getting the feeling the T4500 series represents a new standard in business notebook computing, you're right.

Our T4500C features an LCD TFT active matrix color screen that can display a kaleidoscope of 256 simultaneous colors from a palette of 185,193. Our T4500 offers a large, bright, easy-to-read 9.5" VGA display with 640 x 480 resolution and 17:1 contrast ratio.

A 150-pin expansion port lets you attach a SCSI adapter to the notebook. Or lets you attach the notebook to our Desk Station IV, providing true desktop capabilities in your office.

System control hotkeys save time by allowing you to quickly change your display setting, power management, security status, etc., without having to call up menus.

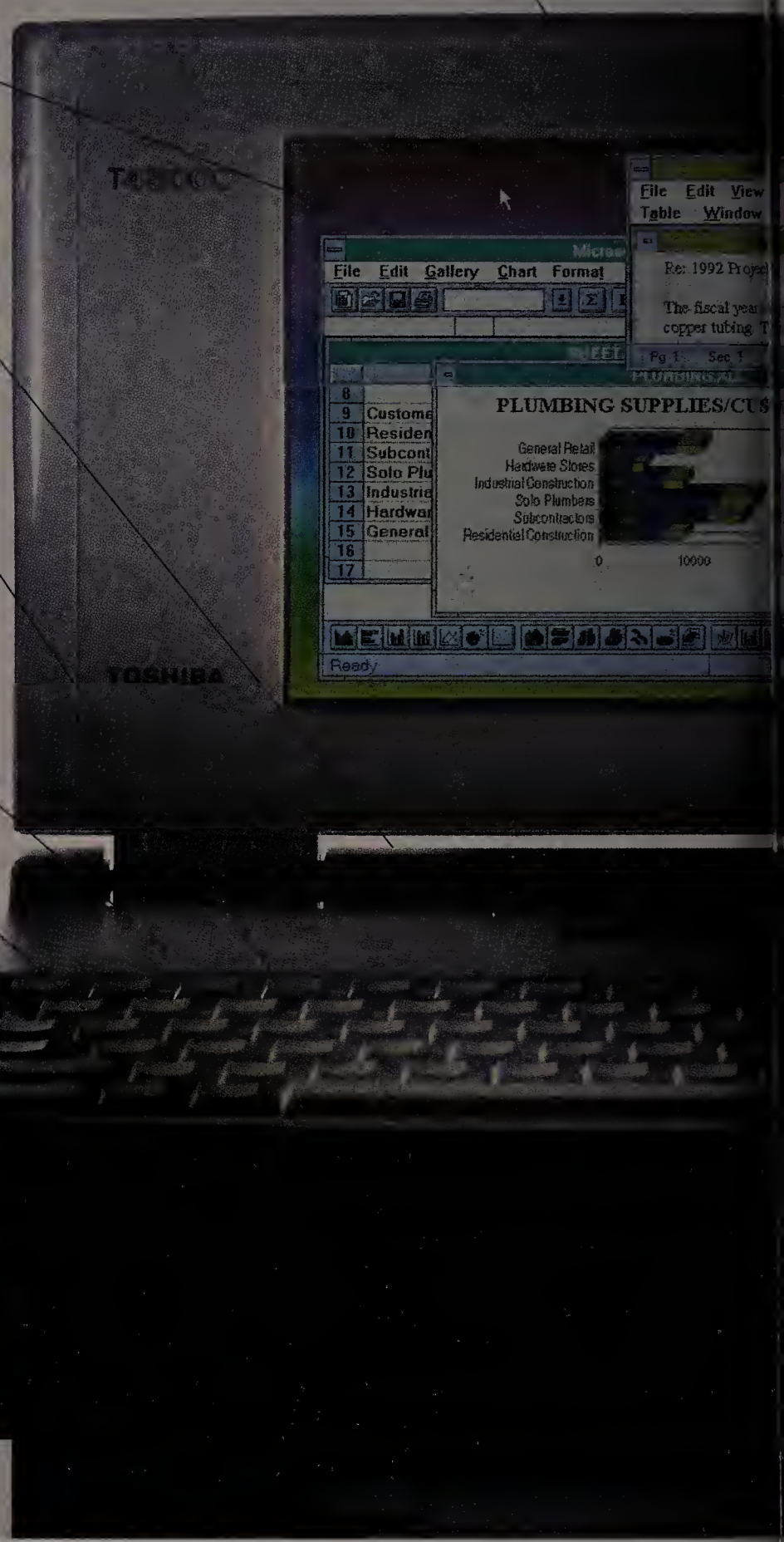
A generous 4MB RAM standard, expandable to 20MB.

Our award-winning keyboard features standard-sized keys and key spacing.

The T4500 series' advanced 20MHz i486™SX processor makes any 386 seem like a tortoise. In fact, tests reveal it's up to two and a half times faster than many 386-based notebooks.

The T4500C comes with a 120MB hard drive and our T4500 comes with a choice of an 80MB or 120MB hard drive.

3.3-volt chip technology decreases power drain by as much as 25%, while adding up to 27% more battery life.



INTRODUCING THE

© 1993 Toshiba America Information Systems, Inc. The Intel Inside logo and i486 are trademarks of Intel Corporation. All products indicated by trademark symbol are trademarked and/or registered by their respective

)PTIONAL.

The T4500C's dimensions: 11.7"W x 8.3"D x 2.0"H.
The T4500's dimensions: 11.7"W x 8.3"D x 1.8"H.
Both fit into half of a briefcase.

Windows® 3.1 and DOS® 5.0 with Ultrafont™ come pre-installed.

AutoResume lets you start where you left off without rebooting and automatically saves your material when you turn the power off.

Our Quick Charge capabilities allow you to charge the battery while you're working.

Featuring AutoResume, AutoSave, Advanced Power Management, and CPU Sleep Mode, our MaxTime™ power management system helps you get the maximum out of every battery charge.

Quickread LCD status icons allow you to check a host of functions (including remaining battery time, keyboard status, and power-saving mode) at a glance.

An industry-standard PCMCIA 2.0 slot accepts removable hard drives, data/fax modems, network adapters, and other expansion options.

The BallPoint™ mouse connects directly to the computer through a unique "one touch" QuickPort,™ so there's no cord to get in your way.

A front-loading floppy drive provides easy access.

Both the T4500 and the T4500C weigh in at about 6.5 lbs.

TOSHIBA T4500 SERIES

The T4500 features a large, easy-to-read 9.5" monochrome screen.

Tests reveal that the 3.3-volt 20MHz i486™SX processor is up to two and a half times faster than many 386-based notebooks.

You can call real-live Toshiba technicians toll-free for complete product support.

intel inside

In Touch with Tomorrow
TOSHIBA
1-800-457-7777

manufacturers.

Circle 257 on reader service card

Point/Counterpoint

PC World asked our author, Celeste Robinson, and another database expert, Ellen Ullman, to offer a few personal comments on each of the programs in our review.

CR: For a project using a single file, I'd be torn between *AceFile* and *Approach*. For my taste, I didn't like *FileMaker Pro* as much.

EU: Yes, *FileMaker Pro* is a very low-end package, but I would recommend it if you need file portability between PCs and Macs.

CR: I found myself actually having fun using *AceFile*. It's nice that you can link the tables.

EU: I agree. *AceFile* was a complete surprise. If *AceFile* would add just one more feature—the option of attaching filters and joins to forms and reports—the package would become vastly more usable.

CR: *Approach* is several steps up from *AceFile*. It's a good choice if you need relational capabilities. It's easy to validate data entry.

EU: This might be a good time to introduce one of my criteria for judging these packages, which is what I call "database application widgets." These are the tasks you have to do over and over again. They include things like building a form or report based on multiple tables or verifying that some data element you've entered is valid by checking that it's in another table. A database application package shouldn't just be able to do these things with macro and function calls; it should make these widgets explicit operations you can enact with a click on an icon or dialog box.

CR: And you should be able to find the operations easily. You shouldn't have to write special expressions. The widget set is one big thing lacking in the high-end packages like *Superbase* and *Paradox for Windows*.

EU: Exactly. The high-end packages should take a lesson from *Approach*. Higher-end packages get all involved in complications like forms with embedded subforms.

CR: Moving up in capabilities, I have to say that I didn't like *DataEase Express for Windows* very much. The box is beautiful, but it was difficult to find information in the documentation. It was hard to build a form with one-to-many relationships or accomplish referential integrity.

EU: At first I thought I would love *DataEase Express*. But I'm afraid it will please neither end user nor developer. It's too complicated for simple tasks, and, since it's not programmable, it's not powerful enough for many real-world applications.

The high-end packages should take a lesson from Approach. —Ellen Ullman

CR: As for the high-end packages, I would say that they're not for the novice or the person who needs to work with just one file. However, for the intermediate user, these products should work very well without the need to hire a developer.

EU: *Paradox for Windows* gives you the ability to really see the visual relationships among tables, which shows that *Paradox* truly understands how database applications are built.

CR: Yes, *Paradox for Windows* is my favorite in putting together multitable documents automatically. You can look at the design layout and see exactly how it's going to work. You can go click-click and see it change. You can experiment, in contrast with *Access*. I tried the Form Wizards and still got lots of cryptic messages. *Access* has a good dialog box to set up searches, but then the search dialog box obscures the data that you found.

For a project using a single file, I'd be torn between AceFile and Approach. —Celeste Robinson

EU: I had similar usability problems with *Access*. For example, if you get an error message while inputting data to try out a table definition, you can't suspend the input window and take a look at the table definition.

CR: *Access* does have one very hot feature. When you're querying a huge amount of data, the package will present the *dynaset*, or answer set, on the screen before the entire search is completed. You can start working with the information right away.

EU: I think querying is the strong point of *Access*. I give it high praise for letting you switch back and forth between visual query writing and SQL. Just as *Approach* is my model for how a tool should accomplish one-to-many forms, *Access* is my model for the scalable visual-to-SQL query tool.

Superbase was the real sleeper in the high-end group. It's not flashy, its widget set is small, but I found it straightforward. And *Superbase* has the advantage of being a 2.0 release. *Access* and *Paradox* may have been rushed to market for competitive reasons.

CR: The issue is, which package makes it easiest to manage your data. Once you strip those graphical features off the menus and tool bars, what are you left with? From the business user's point of view, it's easy to lose sight of the real issue: managing your data.

EU: My ideal database would have the application focus of *DataEase Express* and the great, easy widget set of *Approach*. It would have the query capabilities of *Access*. And it would have the visual data modeling of *Paradox* and *Superbase*.

CR: My ideal database would have the form widgets of *Approach*, the data modeling of *Paradox*—and the fun of *AceFile*.

Ellen Ullman was a principal engineer for the client-side tools for *Sybase SQL Server*. She is currently a consultant with Ideation, a San Francisco–based new-products consulting firm.

FRANKLIN AVERY

trying to integrate data from two or three departments but not your whole organization. The program lets you gather information from a variety of sources, including *Paradox*, *dBASE*, and various SQL formats, and quickly design good-looking reports and forms for a few related tables with little effort. However, when you get into more complicated situations, the timesaving dividend of *Approach*'s simple user interface starts to disappear. *DataEase Express*, with its Query By Model tool that essentially combines the process of querying and reporting on data, offers more functionality than *Approach* but also takes more effort to master.

If you're a power user with some fairly sophisticated relational databases to manage, but you don't want to get into programming if you can help it, *Approach*, *DataEase Express*, *Paradox for Windows*, or *Access* would probably work best for you. You could use *Superbase* as well, but it doesn't have as many end-user conveniences. The weaknesses of these products show up in different areas, so choose carefully to make sure the Achilles' heel of the one you pick doesn't ruin your project.

For application developers who feel that forms with macro-driven action buttons can't do enough, there's *Superbase*, *Access*, and *Paradox for Windows*. Each of these database managers includes its own programming language. The capability to program a database application gives you much more flexibility for those times when menu commands just aren't enough. However, it also requires a considerable time investment to become familiar enough with a programming language. The languages of these three are fairly equivalent in power and can call routines written in other languages.

Any of the three programs could be used to build a database system for a large organization with many disparate groups and data requirements. *Superbase* is the most straightforward but has the fewest features. *Paradox for Windows* would be great for anyone moving over from the DOS version of *Paradox*—despite a completely new programming language—because the querying model remains the same. *Access* is probably the hardest to learn initially, but, with its features, it's easiest to use in the long run.

For projects like our order entry and invoicing task that definitely require the capability to handle more than one data file at a time, you'll need a relational database.

Celeste Robinson is a contributing editor for PC World *and the author of* The Paradox 4.0 Handbook *(Bantam Computer Books, New York, 1992). She can be reached as CELESTEROB on PC World Online* *(see page 10 for more information).*

For more information about all products in this article, circle reader service no. 900.

PC WORLD TEST CENTER REPORT

Database Performance: No Clear Winners

	Find on record key	Find on name	Simple query	Joined query	Customer report
FileMaker Pro for Windows 2.0*	1	1	5	*	*
AceFile 2.0	1	50	25	1093	1091
Approach for Windows 2.0*	1	1	3	2984	599
DataEase Express for Windows 1.0	1	4	3	940	1340
Superbase 2.0 for Windows	1	26	58	1884	1214
Microsoft Access 1.0*	1	21	7	43	2258
Paradox for Windows 1.0	1	8	7	81	2733

*Best Buy

Time in seconds.

*Couldn't complete test.

Methodology Performance tests are different from the application tasks used to evaluate database functionality. These tests evaluate performance on basic database operations.

We tested the *Windows* database programs on a Compaq Deskpro 386/25i configured with 8MB of memory and a 110MB hard drive. Before installing each of the applications, we set up the hard drive with Compaq DOS 5.0 and *Windows 3.1* running at 640-by-480-pixel resolution with 16 colors (standard VGA). To build the test files, we imported our order entry database into the product's native format (or the default format if no native one exists). We used four tables in our tests: a list of employees (1000 records), a list of additional information about those employees who are sales representatives (50 records), a list of customers (5000 records), and a list of orders (about 33,000 records). We indexed each table on a unique field.

Find on record key We measure the time required to find a customer's record based on its customer key.

Find on name We search for the same customer record based on a subset of the company's name (this particular record is located about two-thirds of the way through the data file). We did not index this field.

Simple query We use the product's query-by-example or record filter tool to view 1511 of the customer records selected by a ZIP code range.

Joined query This test and the next cull records from several joined tables. We ask the program to display a list of all orders generated by salespeople earning more than $55,000.

Customer report We measure how long the program takes to generate a report file listing each customer grouped by sales representative.

Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

Drag-and-drop editing

One-step formatting

Automatic bullets

Automatic tables

Lines and borders

Special symbols

UPGRADE TO NEW MICROSOFT WORD 6.0 FOR MS-DOS FOR $99. AND BECOME A MASTER OF MANIPULATION.

Take a few shortcuts and make your everyday tasks a whole lot easier. Just upgrade to new Microsoft® Word 6.0.

To start with, you can automatically add bullets to highlight key points. Or create a table with a single click on the new ribbon. Editing is a snap: use drag-and-drop editing to move text anywhere on the page. Then go back to the ribbon for one-step bold, italic, or underline formatting.

You can just as easily insert commonly used symbols like ©, ™, §, and ®. A few simple clicks and it's done. And with TrueType® fonts, the crisp text you see on your screen is the same text you'll get in your documents – on just about any printer.

Need more impact? Add lines, borders, and shading in one quick step. When all is said and done, run your work through the grammar checker to make sure it's all buttoned up.

With Word 6.0, you'll create polished and professional documents every time.

Right now you can upgrade to Microsoft Word 6.0 for MS-DOS® for $99* and get a 90-day money-back guarantee.** Upgrade today. And see how Word 6.0 can help you become a master manipulator. So make the call.

Make your word processing easier with new drag-and-drop text editing, one-step formatting ribbon, automatic bullets, automatic tables, lines and borders, and special symbols.

To get a copy, see your local reseller. For the name of a reseller near you, or to order by phone, call (800) 468-8899 and ask for Dept. JD4.

Microsoft
Making it easier

© 1993 Microsoft Corporation. All rights reserved. Printed in the United States of America. Microsoft and MS-DOS are registered trademarks of Microsoft Corporation. TrueType is a registered trademark of Apple Computer, Inc. *Plus 7.50 freight and applicable sales tax if ordered directly from Microsoft. **Freight charges are not refundable. Reseller prices may vary. You must currently be a licensed user of any version of Microsoft Word to qualify for this special upgrade offer. To qualify for this offer at your reseller, you must bring proof of purchase with you: 1) the original disk from your program, 2) the title page of the manual, or 3) a copy of the sales receipt. Offer good only in the 50 United States. Offer good until 9/30/93. Inside the 50 United States, call (800) 468-8899, Dept JD4. For information only: in Canada, call (800) 563-9048; outside the United States and Canada, call (206) 936-8661.

FileMaker Pro for Windows 2.0

PROS: Simple, clean, Macintosh compatibility
CONS: Lacking in high-end features

The slick *FileMaker Pro* was a hit with Macintosh database users, and Claris is now promoting it for *Windows* as well. Like a contender for the heavyweight title, it has a lot of show and some real punch. *FileMaker Pro* is a flat-file database that will let you look up and fill in data from one file to another—but that's the extent of its relational capabilities. It passed our first test easily, but we ran into problems on the more advanced scenarios, which involved working with multiple files. .

Notably, the program runs in both the *Windows* and Macintosh environments and shares files across these platforms. A fairly extensive set of security features lets you set up passwords and groups of users with access privileges that define the kinds of activities a user can perform with a file.

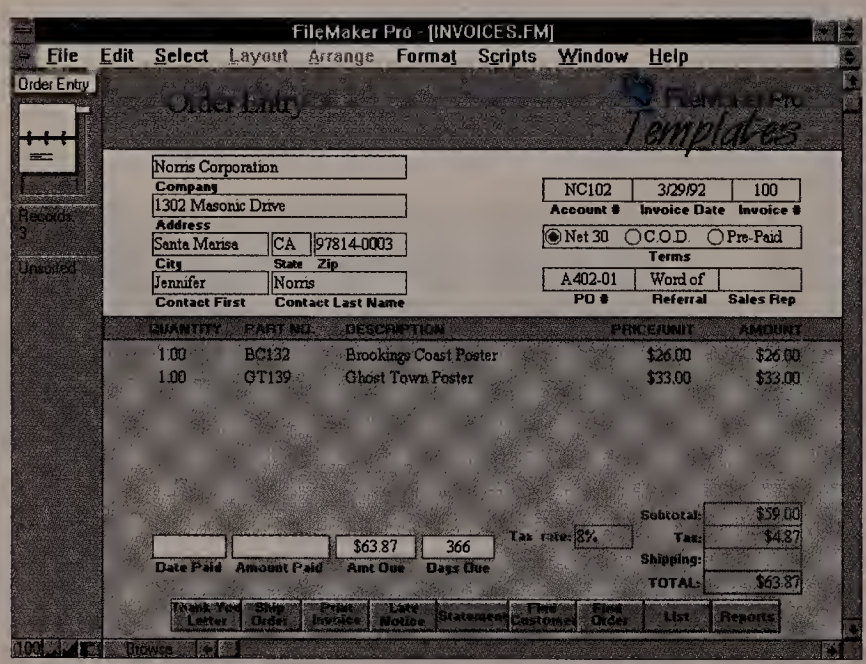
Another of *FileMaker Pro*'s unique features is its variable-length text fields. These simplify the process of creating a data file but come with a few inconveniences. For example, when you design a new layout, you may have to spend some time resizing field objects because the length of the defaults may be quite different from the size of the values you'll be storing in the fields.

An interesting feature that deserves special mention is *FileMaker Pro*'s repeating fields. When you define fields for a file, you can specify that one or more fields be repeated a fixed number of times. This allows you to create repeating sets of data like those you would see on an invoice with multiple detail items.

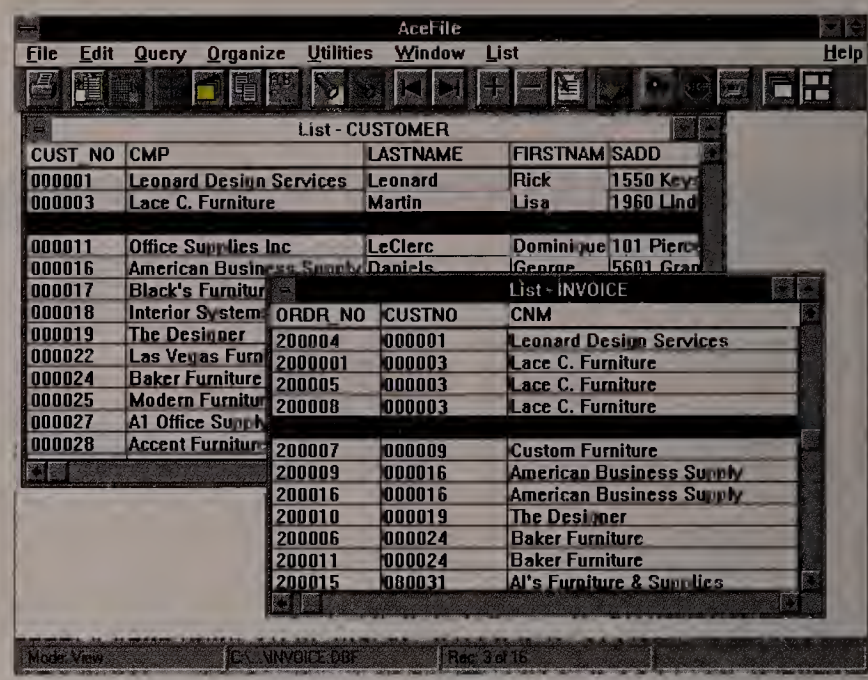
The templates that come with *FileMaker Pro* are easy to figure out and to adapt to your needs. Also worth noting is *FileMaker Pro*'s ScriptMaker feature. You can quickly pick actions from a macro list and associate them with buttons you place on your forms to automate many database tasks with a few mouse clicks. If you don't need relational capabilities, can live with the fixed number limit of the repeating fields feature, or need Macintosh compatibility, Best Buy *FileMaker Pro* is a winner by decision.

List price: $399. Contact: Claris, 408/727-8227.

Reader service no. 607



FILEMAKER PRO INCLUDES A GREAT SET OF TEMPLATES that you can customize for your own work.



ACEFILE LETS YOU JOIN TWO TABLES to create a new data file or define relationships to simulate linked table views.

AceFile 2.0

PROS: Simple, graphs, cross-tabs, inexpensive
CONS: Forces use of macros too often, lacking in high-end features

Like a small runabout car, *AceFile* is easy to get familiar with and fun to use. It's slower than *FileMaker Pro* and requires a little more work to customize data entry. Unlike *FileMaker Pro*, *AceFile* lets you create graphs and cross-tabs and includes a telephone dialer.

Two features push *AceFile* to the upper edge of what's possible with a flat-file program: the Relate and Join commands. With the Relate command, you can define, using common fields, several levels of relationships between data files. Then, when you select a record in your top-level table, *AceFile* automatically highlights the first associated record in any related tables.

AceFile's Join feature lets you link two tables to create a new table. You can report on the resulting table, effectively getting around *AceFile*'s limit of reporting from only one table. But you can suppress only one field of repeating information in a report, leading to unnecessary copies of the other fields.

To its detriment, *AceFile* requires macros to set up lookups, pick lists, and incrementing fields, and it lacks a security system. For simple database projects that require a minimal amount of file linking, *AceFile* should handle your work well, if you don't mind writing macros to get custom features.

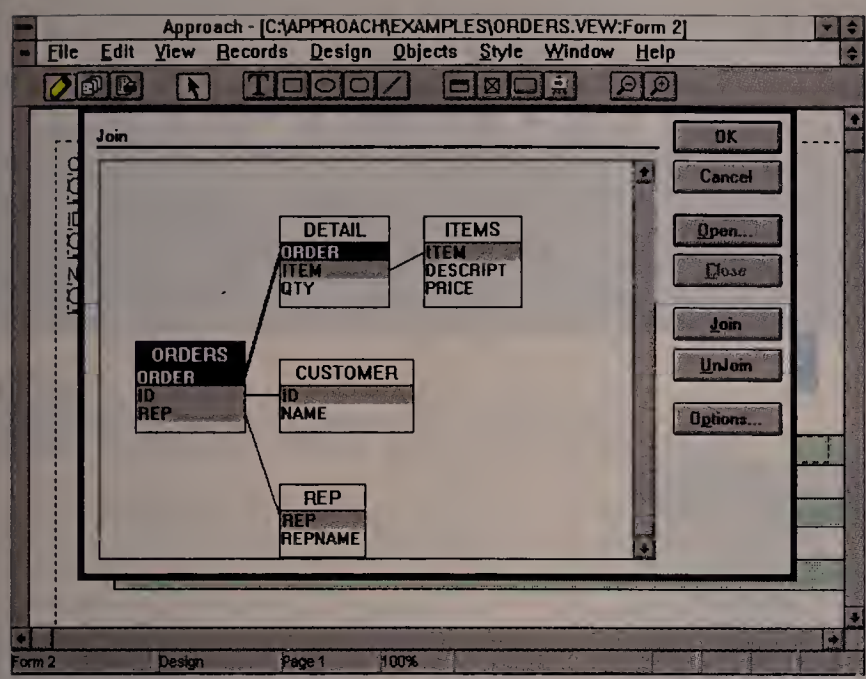
List price: $199. Contact: Ace Software, 408/451-0100.

Reader service no. 608

Approach for Windows 2.0

PROS: Simple design tools, great point-and-click interface
CONS: Lacks programmability and some high-end tools

There's been a lot of excitement about *Approach* since its entry into the *Windows* database market. The program tries to be a jack-of-all-trades without being a master of none—and, for the most part, it succeeds. *Approach* is a relational program that's designed for end users who need easy access to information in any



WITH APPROACH, YOU CAN JOIN TABLES for a form or report by just dragging your mouse to link the tables.

of several formats, including *dBASE*, *Paradox*, *FoxPro*, *Oracle SQL*, and *Microsoft SQL Server*. It lacks the application development tools of *Superbase*, *Access*, and *Paradox for Windows* but includes enough point-and-click tools to make it a good candidate for fairly simple relational database projects.

One of the best features of the program is its simple process for defining relationships between tables. You don't have to worry about setting up indexes for your tables before you relate them, as you do with some of the other relational programs. *Approach* sets them up automatically and keeps track of them for you. The process of creating a two-table form for our follow-up report was as easy as ordering lunch—and took about as long. But we discovered some potential pitfalls while using five related tables for our order entry/invoicing task. If you don't highlight the right master table when you add tables to either the main part of a form or a repeating panel, you can have trouble entering data later. This problem should be clearly documented so that you don't make a mistake, or the program should use a different method.

Approach includes abundant options for customizing data entry by just pointing and clicking. You can add lookups, incrementing fields, default values, pick lists, field formatting, and other checks without writing any macros or *expressions* (a code word meaning that you need to know the proper syntax for entering what you want). And although *Approach* doesn't include style sheets in the manner of *DataEase Express*, you can easily set your preferred defaults for screen elements like field and label styles and fonts and for treatment of pictures.

There are places where the user interface could be improved. In the case of creating multitable forms or reports, you can have problems if the proper table name isn't highlighted when you close the Create dialog box. This pitfall wouldn't be a big deal except that you can't change the tables used in a document once it's created—unlike in other relational programs, you have to design a new form or report from scratch. *Approach* completed the fourth task, summarizing sales by salesperson, with greater difficulty because of its complexity. The program's ease of use in some areas balanced its limitations with larger numbers of files, so it took about the same amount of time to complete the tasks as the other programs overall. Best Buy *Approach* probably has all the tools you need to manage your information, especially if you can do without the programmability of more high-powered databases such as *Paradox for Windows* and *Access*. Because it handles moderately difficult tasks well, it could also replace a flat-file database, should you decide you may need more capabilities in the future.

List price: $399. Contact: Approach Software, 415/306-7890.

Reader service no. 609

DataEase Express for Windows 1.0

PROS: Good range of features, Query By Model tool
CONS: Spotty user interface and documentation

Somewhere at the core of *DataEase Express for Windows* are two conflicting directions struggling for dominance. *DataEase Express* is marketed as a tool for end users rather than programmers. Yet it's oriented to application design. This conflict in character limits the extent to which we can recommend it for novice database users.

We were able to review only version 1.0 of *DataEase Express*, but version 1.1 will be available by the time you read this. The new version supports more import/export options and lets you access data in *dBASE*, *Paradox*, several popular SQL, and other formats.

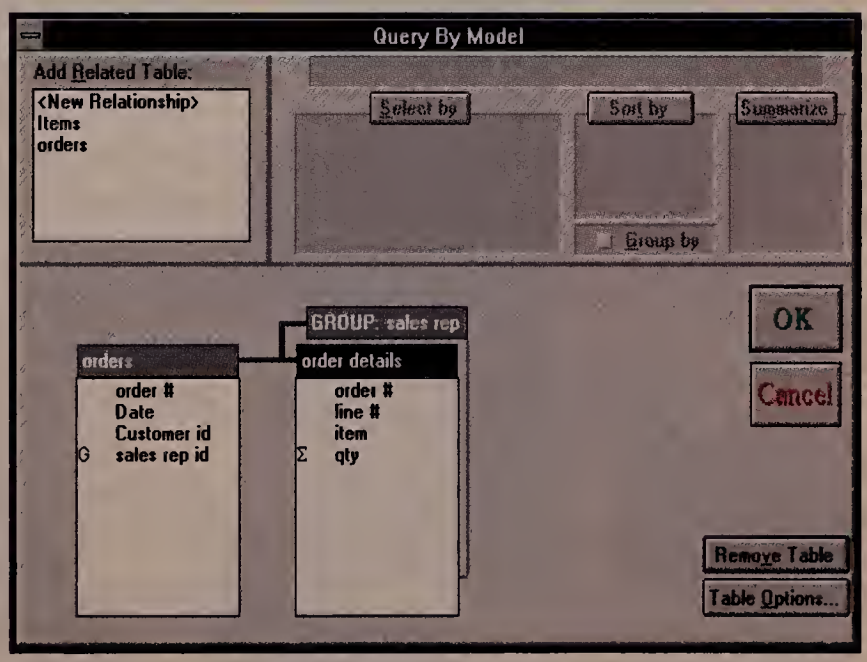
DataEase Express has a wonderful variety of field types, such as Choice for creating pick lists, which simplify the process of putting data entry checks in a table. But for a few other tasks, you have to create "derivation formulas" or "validation formulas" to get custom data entry features.

One of the most powerful tools in *DataEase Express* is Query By Model, which lets you choose the tables, relationships, fields, and record selection criteria for a report all from one dialog box. You can even add summaries and sorts to the report or group data within it by clicking in the right places.

DataEase's complexity derives from the relational capabilities it provides. It already has some of the ease-of-use features it needs, but with clearer documentation and better signposts in the user interface, it could hit the mark precisely for its intended audience.

List price: $395. Contact: DataEase Int'l, 800/243-5123.

Reader service no. 610



DATAEASE'S QUERY BY MODEL TOOL lets you relate tables and sort, group, and summarize data for a report all from one dialog box.

This is one Local Bus you'll

Why settle for the bottleneck of slow video or sluggish hard drive performance?

With Insight's new VESA® Local Bus™ compatible system you don't have to.

These systems come standard with a 32-Bit VESA® Local Bus™ compatible video card and a 32-Bit VESA® Local Bus™ compatible IDE hard drive control- ler to give you top performance in both video and hard drive.

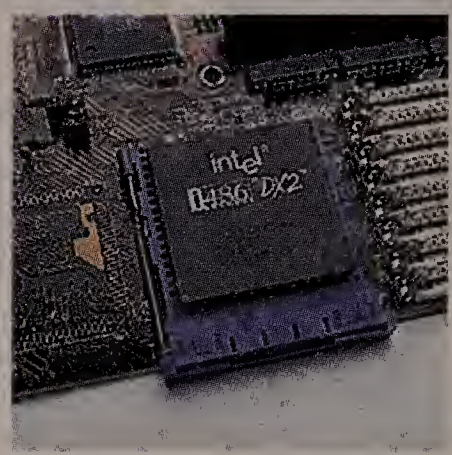
In fact, you can expect a 400% increase in hard drive performance. And video performance that's nearly double that of our nearest competitor.

With VESA video and hard drive, graphic intensive programs will pop onto your screen. And your numbers will crunch at awesome speed. How? Peripherals running from adapters on the CPU's local bus will run at full clock speed, rather than 8 or 12MHz as on a 16-bit ISA bus.

What's more, the Insight VESA® Local Bus™ is upgradable.

With our 238-pin ZIF (Zero Insertion Force) OverDrive™ socket for Intel's next generation processor based on the Pentium™ architecture, you'll keep current with the newest technology.

Comparison based on sequential read tests performed on a 16-bit controller and the new VESA Local Bus™ compatible IDE 32-bit controller.



Note the extra row of pin holes. That's for the upgrade to Intel's OverDrive™ based on the Pentium™ architecture!

The time is now to move up to Insight. According to PC Sources magazine, "A better balance of CPU hard drive and video throughput means better overall applications performance."

Why wait to break the information bottleneck? Call us today and we'll get you up to speed. Fast.

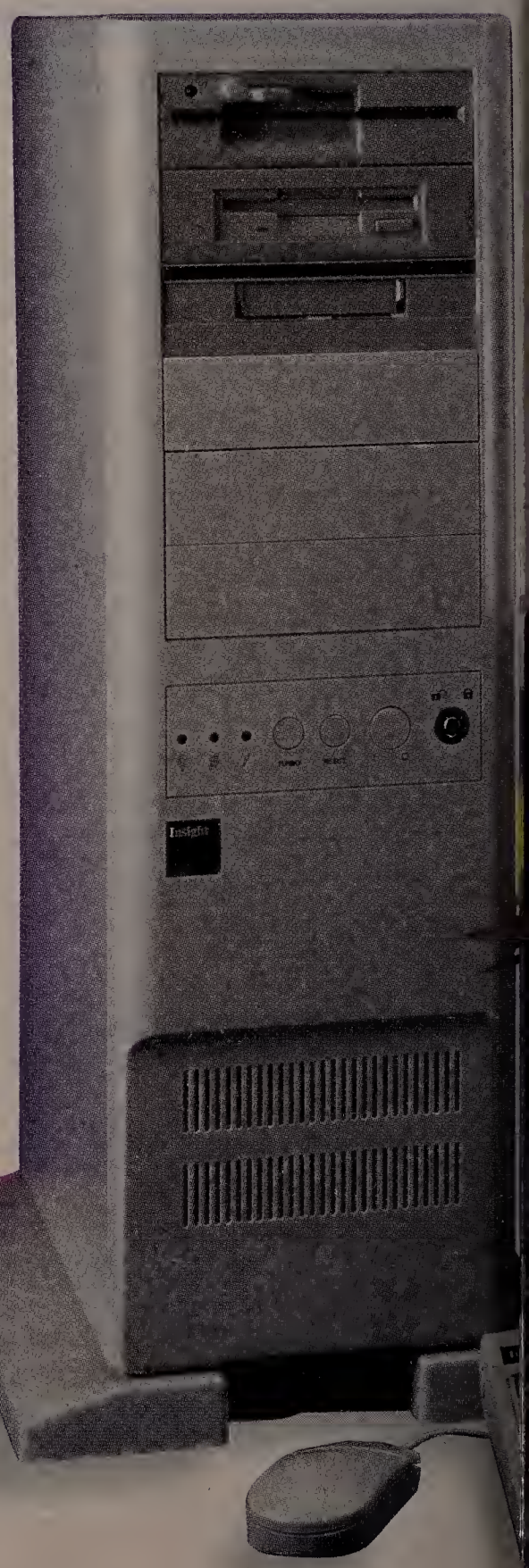
We're here 24 hours a day, seven days a week to help customize your system.

And you won't be left high and dry once the sale is complete. Your Insight 486 VL system comes with a 30-day "worry-free" money-back guarantee and a one-year Warranty/ Replacement Policy.

Of course, we accept all major credit cards and offer leasing plans with low monthly payments.

Ask about the Insight Credit Card, too. It's convenient, no annual fee, no down payment, with low monthly payments.

Call now and see how affordable it is to "Buy the Super Direct™ Way".



Prices and availablity subject to changes without notice. All items are NEW. PO's accepted from qualified buyers-NET 30. APO/FPO orders add $16 for US Post express mail. PO's, 30-Day Guarantee and 1-Year Replacement Policy may have some restrictions.

never have to wait for.

Insight

Insight 486 VL Full Vertical

Fully upgradable Intel 80486 CPU
2 VESA® Local Bus™ compatible slots
4MB RAM - 128K Cache
250MB 12ms IDE Hard Drive
32Bit Local Bus™ compatible IDE Controller
32Bit Local Bus™ compatible 1MB Graphics accelerator Super VGA Card
14" Non-interlaced Super VGA Color monitor
1.2MB 5.25" Floppy Drive
1.44MB 3.5" Floppy Drive
2 Serial Ports, 1 Parallel Port
Enhanced 101 Key Keyboard
MS-DOS 6.0
Mouse
Full Vertical Case
Free Lotus Works™ Software

486DX2-66MHz
$2,299
as low as $117/mo.

486-33MHz	$1,999
486DX2-50MHz	$2,199

FREE Lotus Works *Software!*

Add these great values to your Insight or other PC system:

Insight 15" Monitor
A must for windows users! High resolution autoscan, 15" flat square anti-glare screen. Up to 1024 x 768, non-interlaced, .28mm dot pitch, detachable tilt and swivel base.
CM4000 ..... **$399**

Talon TA-2000 Multimedia Kit
A complete, top-of-the-line multimedia kit including a Talon TA-200 CD-ROM drive:
• 280ms access time • Multispin • 64K buffer • 300KB transfer rate • Sound Blaster™ compatible sound board • Amplified stereo speaker set • Stereo headphones • Installation manual • Free CD software- Toolworks Multimedia Encyclopedia, Software Jukebox, Guinness Disc of Records, The Animals, National Parks Guide, Sherlock Holmes and The Mayo Clinic Family Health Book.
ODTA2000MK **$699**

Talon™ by Colorado 250MB internal tape backup
Standard QIC attaches to existing floppy controller.
2-3MB/minute, with data compression.
2 FREE tapes included.
TBTA250IK **$219**

340MB Western Digital IDE Hard Drive
WD2340A, 12ms, 3.5", 1"H
Bare Drive Kit **$469**
Upgrade from 250MB **$138**

We're more than Multimedia. Call today for your

FREE Catalog packed with over 20,000 products!

HARD DRIVES *International*®

(800) 359-0322

Insight®

Insight Distribution Network, Inc.
1912 W. 4th St., Tempe, AZ 85281
Local 602-350-1176
Fax 602-350-1150

Shipping is non-refundable. Lease figures based on 24-month F.M.V. lease, sales tax not included. Leases are non-cancelable and may require a deposit. All trademarks are the properties of their repective owners. Intel Inside is a registered trademark of Intel Corporation. 6/93

Circle 131 on reader service card

Superbase 2.0 for Windows

PROS: Powerful, straightforward
CONS: Few design tools, no built-in macros

Superbase is the granddaddy of *Windows* databases. It's the only high-end program here in its second major version, and the experience of the first lifetime shows. It was straightforward work to sit down with *Superbase* and its excellent documentation and figure out how to complete our first four tasks. Unlike some of the other relational programs, *Superbase* didn't present too many quirks; we didn't have to try a job several times before getting it right.

One noticeably weak area is *Superbase*'s default forms and reports, which are pretty plain. Also, the program lacks an easy way to switch back and forth between design mode and the mode in which you see forms or reports containing your data. This deficiency hampers the process of modifying documents or setting up a new design. A point in *Superbase*'s favor: It was quite simple, after a

SUPERBASE LETS YOU USE QUERY BY EXAMPLE to ask questions about your information or to update data files.

FEATURES COMPARISON

Windows Databases: The Details Matter

● Yes
○ No
n/a = not applicable

	BEST BUY FileMaker Pro for Windows 2.0	AceFile 2.0	BEST BUY Approach for Windows 2.0	DataEase Express for Windows 1.0	BEST BUY Superbase 2.0 for Windows	Microsoft Access 1.0	Paradox for Windows 1.0
List price	$399[1]	$199	$399	$395	$795	$495	$795
File formats directly supported							
Popular PC formats	FileMaker Pro	dBASE	dBASE, Paradox, FoxPro	DataEase, Paradox, dBASE[2]	Superbase, dBASE	Paradox 3.x, dBASE, Btrieve, Access	Paradox, dBASE
SQL access	○	○	●	●[3]	●[4]	●	●[3]
Export/Import formats							
Popular PC formats	D, 1, E, T[5]	D, 1, T[5]	D, 1, E, P, T[5]	D, 1, P, T[3, 5]	D, 1, E, P, T[5]	D, 1, E, T[5]	1, E, Q, T[5]
Relational capabilities							
Number of tables that can be linked	lookups only	10 for table views	10	100	[8]	32,768	[6]
Link tables in forms and reports	○	○	●	●	●	●	●
Database-level referential integrity	○	○	●	○	●	●	●
Form-level referential integrity	○	○	●	●	●	●	●
Point-and-click data checks							
Lookups, pick lists	●	●[7]	●	●	●[8]	○	●
Incrementing fields	●	●[7]	●	●	●[8]	●	○
Data presentation							
Style sheets or preference setting for objects	○	○	●	●	●	●	●
Avery label layouts included	●	●	●	●	○	●	○
Cross-tabs	○	●	○	○	○	●	●
Graphs	○	●	○	○	○	●	●
Automatic linking of data files	n/a	n/a	○	●	●	●	●
Point-and-click multitable layout design	n/a	n/a	●	●	●	●	●
Experts, Wizards, or other guides	○	○	○	●	○	●	●
Attach filters to documents	○	●	●[7]	●	●	●	●

quick look in the documentation, to link tables and use them in multitable forms. And once these forms were completed, there were no hassles during data entry.

Though the user interface has problems in places, *Superbase* includes several niceties, such as an easy-to-manipulate table view, messages that can be turned on and off as desired, well-indexed documentation, and hot keys listed on the menus. The Query by Example facility works similarly to the QBE made popular by *Paradox* for DOS, and the program includes communications software.

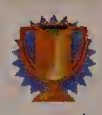
Superbase hasn't done well in previous *PC World* reviews. However, this latest revision has improved the program dramatically. Overall, even with its programming capabilities, *Superbase* is fairly user-friendly. In comparison to *Access* and *Paradox for Windows*, it may seem a little plain, and it definitely lacks razzle-dazzle features like direct edit of query results. But for a relational program that really manages data, *Superbase* can hold its own.

List price: $795. Contact: Software Publishing, 408/988-7518.

Reader service no. 613

Microsoft Access 1.0

PROS: Powerful, good design tools, macros
CONS: Difficult to learn, idiosyncratic



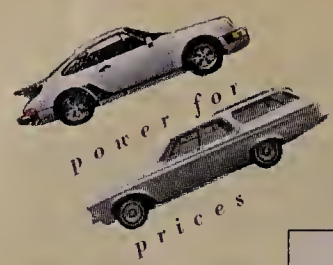
Access has created a huge stir in the *Windows* database market, in part because of the initial offer to sell it for $99 (it's now $495). Another reason is the report of serious bugs when the program is used with very large sets of data. These bugs should be fixed by the time you read this.

Access's treasure trove of neat features really makes some complex tasks a snap. However, unless you're already a power database user, don't expect to just fire up the program and start whipping out forms and reports. Even though *Access* is marketed as user-friendly, you need to be willing to put in some time to discover how it does things.

Access's relatively steep learning curve becomes apparent as soon as you try to work with data from multiple tables in the same form or report. Unlike other programs we looked at, where tables don't

	BEST BUY FileMaker Pro for Windows 2.0	BEST BUY AceFile 2.0	BEST BUY Approach for Windows 2.0	DataEase Express for Windows 1.0	BEST BUY Superbase 2.0 for Windows	BEST BUY Microsoft Access 1.0	Paradox for Windows 1.0
Queries							
QBE, QBF	●	○	●	●	●	●	●
Experts, Wizards, or other guides	○	○	○	●	○[9]	●	●
Embed SQL requests	○	○	●	○	●	●	●
Edit query results directly to update original	●	●	●	●	○	●	○
Create from form or report	●	n/a	○	●	○	●	●
Security							
Group or application level	●	○	○	●	○	●	●
Table level	●	○	●	●	●	●	●
Field level	●	○	●	●	●	●	●
Data types supported							
Text, numeric, date, binary	●	●	●	●	●	●	●
Time	●	○	●	●	●	●	○
Memos	●	●	●	●	○	●	●
Currency	●	●	●	●	●[10]	●	●
Counter	○	○	○	●	●[10]	●	○
Logical	●	●	●	●	●[10]	●	○
Application development							
DDE and OLE	○	●	●	●	●	●	●
Point-and-click action-button definition	●	●[7]	●	●	○	●	●
Programming language	○	○	○	○	SBL	Access Basic	ObjectPAL
Run time	○	○	○	○	●	○	●
Supports calls to DLLs	n/a	n/a	n/a	●	●	●	●

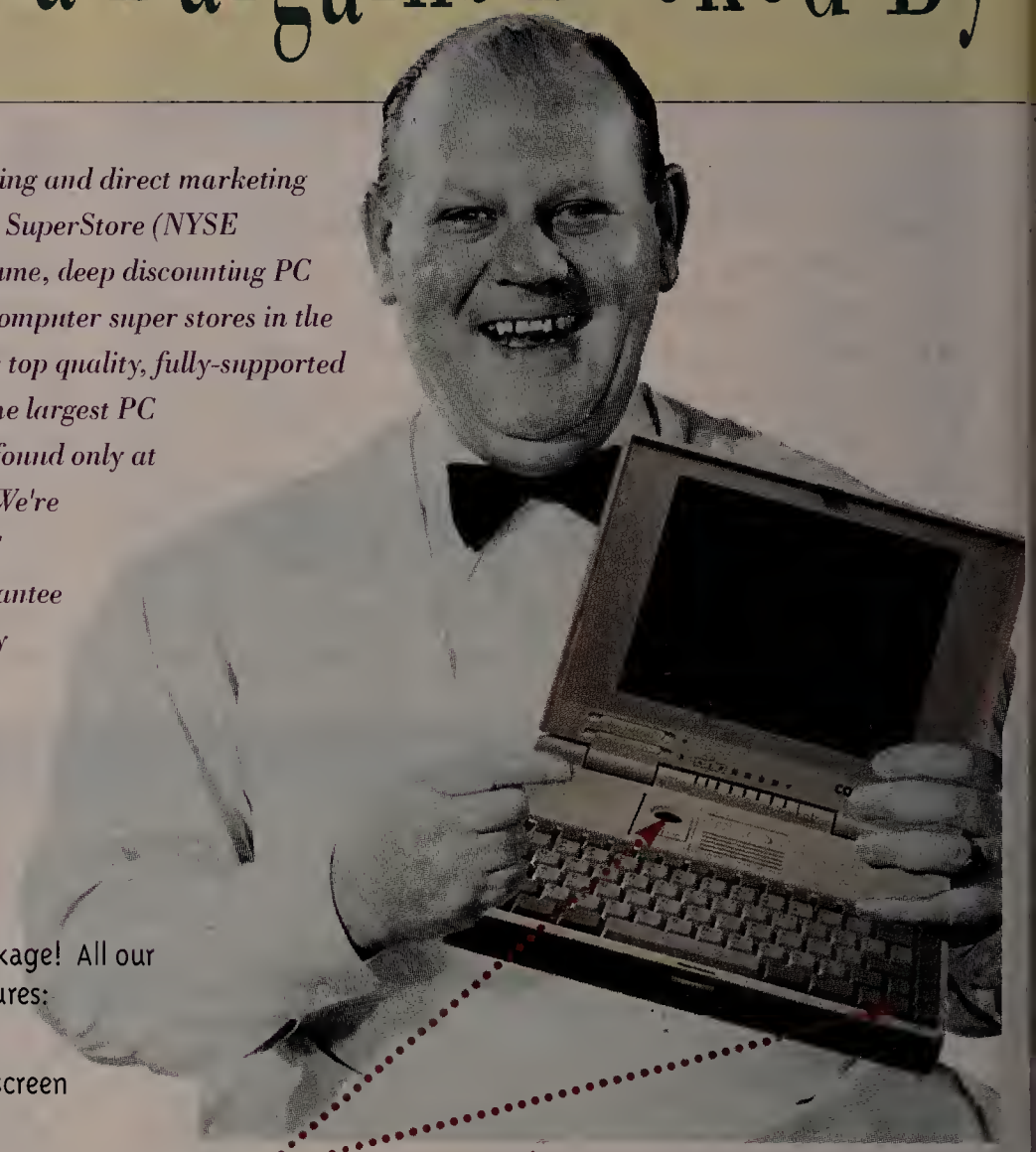
[1] $99 for Q&A users, including translator, before June 30, 1993.
[2] DataEase currently supported; all other formats to be supported in forthcoming version.
[3] In forthcoming release.
[4] Requires SQL Library add-on.
[5] D = dBASE, 1 = 1-2-3, E = Excel, P = Paradox, Q = Quattro Pro, T = text.
[6] Limited by disk space.
[7] Requires macro.
[8] Requires expression.
[9] Through programming.
[10] With data formatting.



Bonanza Bargains Backed By

If you can find a PC that meets or exceeds our equivalent specification, but is shipping at a lower advertised price, we'll beat that price.

Compudyne is the PC manufacturing and direct marketing arm of Comp USA™, The Computer SuperStore (NYSE symbol: CPU)–inventors of big volume, deep discounting PC retailing, and the largest chain of computer super stores in the country. Compudyne manufactures top quality, fully-supported computers as available from only the largest PC manufacturers, at prices typically found only at garage shop clone houses. Result? We're already one of the largest direct PC companies in the country and guarantee that our prices are the lowest of any currently advertised.

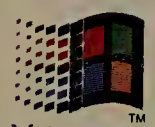


Navigation made easy with full size 84/85 key keyboard with 36 function keys including arrow keys laid out in an inverted T formation and trackball.

Notebooks

Tons of features in a 5 1/2 pound package! All our notebooks include these handy features:

- 11"x 8.5"x 1.6" (That's small!)
- Full 10", 64 grayscale brilliant VGA screen
- Internal 3 1/2" 1.44 MB floppy drive
- Convenient built-in trackball
- External SVGA monitor and keyboard support
- Full keyboard–dedicated 'page up/down', 'home' and 'end' keys
- Built-in serial (2) and parallel (1) ports
- Expansion station option
- User-installable FAX modem and other options
- **386s:** RAM: 2 MBs standard, 4 & 6 MB options; Battery life: 3.5+ hrs.
- **486s:** RAM: 4 MBs standard, 8 & 20 MB options; Battery life: 2.5+ hrs.
- Preloaded with Microsoft® DOS 6.0, Windows™ 3.1 and Lotus® Organizer ™



386SXL/25
386SL/25
Best Buy, April 1993

486DX/33
Best Buy, Laptop Issue, Sept. 1992

NOTEBOOK	CPU	HD (MBs)	PRICE
386SXL/25	386SXL-25 MHz, OPTIONAL 80387SX	80	$1,399 $52/mo*
386SL/25	INTEL 80386SL-25 MHz, 64K CPU CACHE, ADVANCED SL POWER MGM'T	80	$1,499 $56/mo*
486SX/33	INTEL 80486SX-33 MHz, 8K CPU CACHE	80	$1,999 $74/mo*
486DX/33	INTEL 80486DX-33 MHz, 8K CPU CACHE	130	$2,299 $85/mo*

"With a Graphics Winmark score of 2.3 million, the Compudyne 486DX/33 gives you desktop performance and storage in 7.6 pounds of travel weight." (8/92)

PC MAGAZINE

"...You'll be hard-pressed to find a unit with a better blend of speed, portability, and quality construction than the SlimNote." (8/92)

PC Sources

"The Compudyne SlimNote 4DX/33... (uses) a marvelous design that wraps a 33 MHz 486DX in a package just over 6 lbs. (This was one) of our favorites." (12/92)

PC Computing

WARRANTIES

- 30-day, no-questions asked, return policy.√
- One year limited warranty.
- Extended warranty available.

SERVICE & SUPPORT

- Toll-free technical support.
- On-site service for desktops†.
- Training classes available.

NOW ON * GSA * SCHEDULE

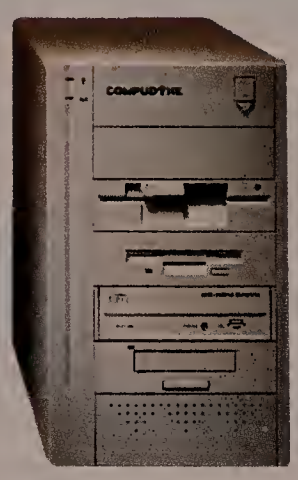
1-800-862-3088

FAX: 1-214-888-5783

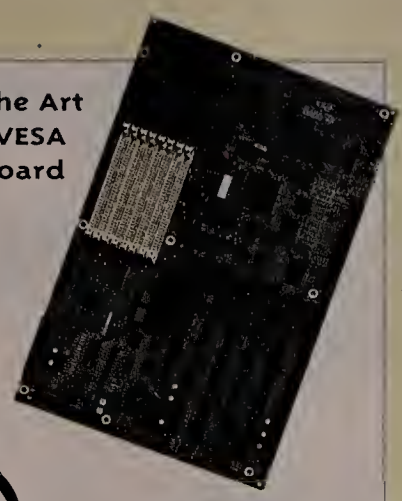
GSA#: GS00K 93AGS-6319

Magazine quotes courtesy of: PC Computing, December 1992 pg. 78, ©1992 Ziff Communications Company; PC Sources, reprinted from PC SOURCES, August 1992, ©1992 Coastal Associates Publishing L.P.; PC Bus is optional at an additional cost. √ Must be returned "as new" in original package. *Leasing arranged through Leasing Group, Inc; payments based on 36 month open-end rate. Prices and specifications CompUSA SuperStore.

A Billion Dollar Business.



State Of The Art
Upgradable VESA
Local Bus Board



intel inside

DESKTOP	CPU	RAM/HD	VIDEO BOARD/MONITOR	PRICE
486SX/25††	INTEL 80486SX-25 MHz, 8K CPU CACHE	4 MB/ 120 MB HD	16-BIT VGA CARD/ 14" 800x600 VGA COLOR MONITOR	$999 $37/mo*
486SX/33††	INTEL 80486SX-33 MHz, 8K CPU CACHE	4 MB/ 170 MB HD	16-BIT SVGA CARD/ 14" 1024x768 SVGA COLOR MONITOR	$1,199 $44/mo*
486DX/33 CACHE	INTEL 80486DX-33 MHz, 128K CPU CACHE	4 MB/ 210 MB HD	16-BIT TRUE COLOR SVGA 1 MB VIDEO CARD / 14"1024x768 SVGA .28 DDT PITCH NON-INTERLACED COLOR MONITOR	$1,599 $59/mo*
486DX2/50 CACHE	INTEL 80486DX2-50 MHz, 128K CPU CACHE	4 MB/ 210 MB HD		$1,799 $67/mo*
486DX2/66 CACHE	INTEL 80486DX2-66 MHz, 128K CPU CACHE,	4 MB/ 245 MB HD		$1,999 $74/mo*
486DX/50 CACHE	INTEL 80486DX-50 MHz, 128K CPU CACHE	8 MB/ 330 MB HD		$2,299 $85/mo*

PC WORLD BEST BUY

486SX/25 Best Buy, Dec. 1992

CG&H BEST BUY

486DX2/66 Nov. 1992

- *Runs any Intel 486 CPU-SX, DX, DX2... all the way to the 1993 super OverDrive processor based on Intel's Pentium™ architecture.*
- *Just pop the upgrade into our Low Insertion Force socket, change settings and go!*
- *Latest 32-bit chipset with up to 256K write-back cache for high performance.*
- *Includes (2) serial, (1) parallel, and (1) game port and support for 2 floppy & 2 IDE hard drives built into the motherboard. No switches or jumpers. It's entirely configurable through the BIOS.*

Desktops

Pick a pre-configured PC or configure your own! Every system includes:

- 1.2 and 1.44 MB floppy drives (except 486SX systems)
- 6 I/O board slots
- 200 watt power supply
- 101 key AT-style keyboard
- Preloaded with Microsoft DOS 6.0 and Windows 3.1
- Microsoft compatible serial mouse
- U/L listing; FCC certification

Lightning Video Family...

Looking to fire up your video performance? Choose from our line of super-fast VESA Local Bus video cards, up to 50 MM Winmarks (v. 3.11). They turn your applications into speed demons!

Get Horizontal...

Our standard desktop systems feature a rugged plastic-over-steel construction with "one screw" assembly for quick 'n' easy upgrades. They support 3 externally accessible 5.25" and 2 internal 3.5" drive bays.

Get Vertical...

Our mini-towers offer an amazing 6 drive capacity in a tiny 8"x 16" footprint: 4 externally accessible, plus 1 internal 5.25" and one internal 3.5", for only $100 more.

Choose From More Fun Stuff:

- *Displays:* Mono or color VGA; 1024 and 1280 interlaced or non-interlaced; 14", 15", 17" and 21".
- *Hard Drives:* 120; 170; 210; 245; 330; 420; 535; 680 MBs or 1.2 GBs & larger.
- *Complete Multi-Media Kit:* including CD-ROM, Sound board, speakers and tons of software.
- *Internal FAX/Modem:* 9600 bps send/receive fax; 2400 bps modem; including WinFax or Quicklink Software.
- *And Much, Much More... we stock* over 5000 name brand products!

YOU CAN ALSO BUY THESE PRODUCTS Exclusively At COMPUSA The Computer SuperStore.

COMPUDYNE

THE LOWEST OF THE LOW PRICES. GUARANTEED.

Compudyne Direct, 15167 Business Ave., Dallas, TX 75244

DIAL TO SAVE DOLLARS

1-800-862-3081

Business Hours (CDT): Mon.-Fri. 7am-10pm; Sat. 9am-5pm

IN CANADA
1-214-702-0055

24 HOUR FAX
1-214-888-5743

CORPORATE CREDIT AND VOLUME TERMS AVAILABLE.

PCW0631

Magazine reprinted form PC Magazine, August 1992, ©1992 Ziff Communications Company † Within the continental United States. ††Features only one floppy drive of your choice and standard 486 motherboard. The Local subject to change without notice •Intel™ 386 & 486 & the Intel Inside logo are trademarks of Intel Corp. ™/® Trademarks belong to their registered owners. Each system unit will be shipped from the nearest

Circle 14 on reader service card

ACCESS'S FORM WIZARD prompts you through creating a form, even for multiple related tables, as in our order entry task.

need to be keyed before being joined, *Access* enforces stringent rules regarding joins. And keying tables is not an intuitive task.

Yet if you make it past the initial hump of keying and relating tables, being able to use the Form and Report Wizards for related tables makes the effort worthwhile. The Wizards prompt you through the process of designing forms and reports, leaving you with document layouts you can then customize to your heart's content. The Wizards provide enough capability that we were able to use them to create all the forms and reports for our tasks. But the documentation for the Wizards is incredibly short, considering what they can do.

Other *Access* strong points include querying and its macro language. But again, you'll probably have to acquaint yourself with these functions through the documentation or the Cue Cards, an innovative extension of the program's on-line help system.

Overall, Best Buy *Access* is a powerful tool that has most of the features that any power user or application developer could need, plus a few extras. It has a rich set of macros that can be attached to buttons, and its own programming language, Access Basic. But if you're a beginning database user, be prepared to hit the books or the Cue Cards to deal with the program's idiosyncrasies.

List price: $495. Contact: Microsoft, 800/426-9400.

Reader service no. 612

Paradox for Windows 1.0

PROS: Powerful, good query tools, good programming language
CONS: Difficult to summarize calculated fields

Like *Access,* and like an octopus, *Paradox for Windows* reaches out in all directions. It includes many features that appear to be designed for the end user, yet at the other end of the spectrum, it also has its own programming language, ObjectPAL. The result is a database manager that can jump through all the hoops but is short on the end-user conveniences found in some of the less-powerful products.

Paradox for Windows quickly accomplished our first test task with no problems. You can assign various data entry checks (including lookups), define indexes, set passwords, and even define referential integrity all in the same dialog box—a nice capability. With Speedbar buttons for Quick Forms and Reports (even Quick Cross-tabs and Graphs), simple forms and reports are a snap.

For both of our multitable forms, *Paradox for Windows'* Data Model, the dialog box you use to specify the tables and relationships for a document, made short work of naming and relating the tables. With the proper keys in place, *Paradox/Win* was able to correctly guess how the tables should be linked for the two-table form.

Although it was extremely easy to get decent default form and report layouts, even with several related tables, we ran into problems trying to add the summary information to our order entry form and invoice report. Unbelievably, *Paradox for Windows* will not allow you to summarize a calculated field either on a form or in a report easily—an incredible oversight, especially since *Paradox* for DOS can do it. Sure, you can do the calculation in a query and then report on the results for an invoice, but for a form you need to enter the calculation's result manually or use some trick to store the data in a real field for summarizing. In either case, you shouldn't have to work so hard to accomplish such a common task.

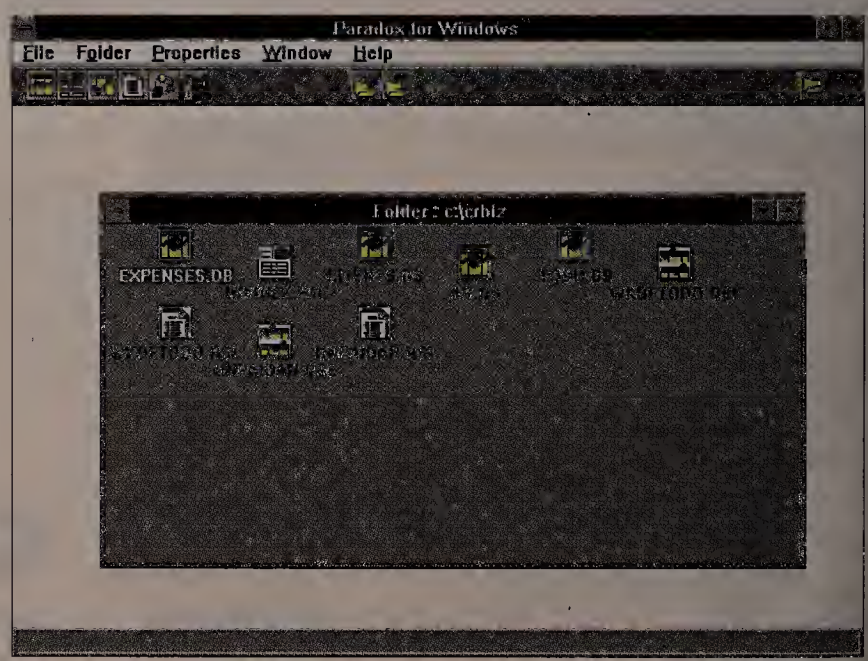
Paradox for Windows retains the easy-to-use Query by Example facility first popularized in its DOS version. One great new feature lets you base a query on a form or report. If the form or report you specify includes linked tables, *Paradox/Win* automatically joins the tables for you in the query window.

Defining action buttons for forms is not easy. You have to write "methods" in ObjectPAL and attach them to buttons. There are no predefined macros to choose from, unless you want to hunt through the sample code that comes with the program. Also, *Paradox* for DOS users should note that programs written in PAL (Paradox Application Language) will not run under *Paradox for Windows.*

Paradox for Windows is very much like *Access* in its range of capabilities. It provides good relational tools, has an extensible programming language, and offers lots of extras, such as graphing and its Object Inspector, which lets you quickly change the properties of almost any object you see on screen. The program is not for casual users, though. To make the best use of *Paradox for Windows,* you must be willing to spend some time discovering how it works.

List price: $795. Contact: Borland Int'l, 800/331-0877.

Reader service no. 611

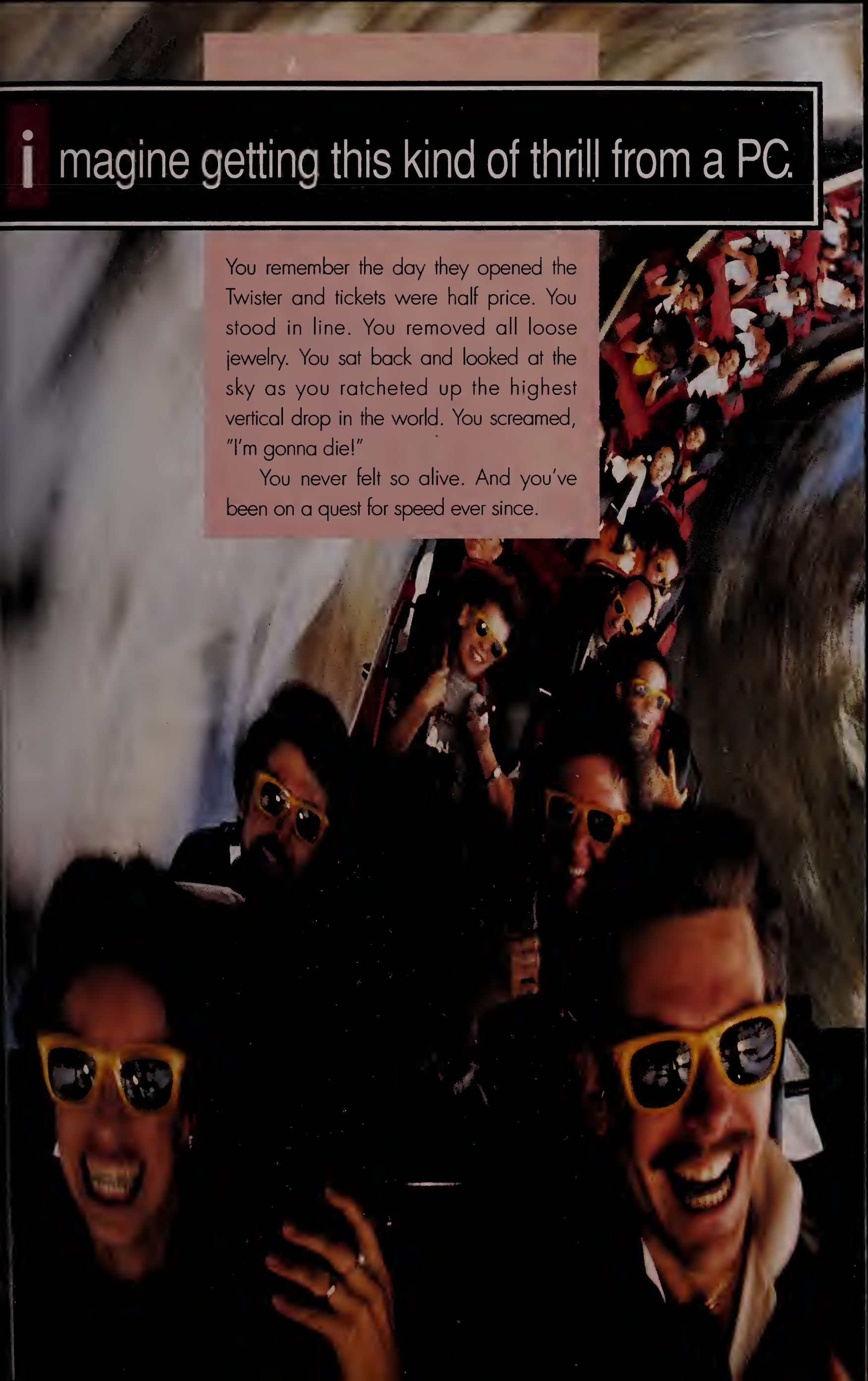


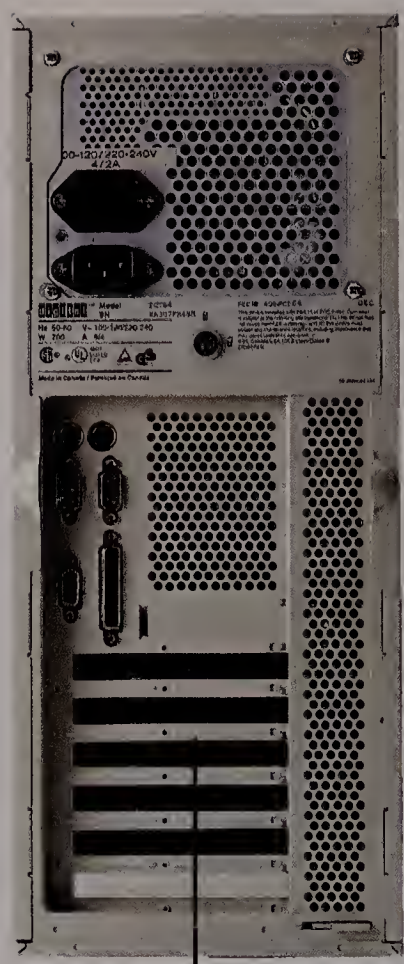
WITH PARADOX FOR WINDOWS, you can create a Folder for tables, forms, reports, and queries and open them with a single mouse click.

imagine getting this kind of thrill from a PC.

You remember the day they opened the Twister and tickets were half price. You stood in line. You removed all loose jewelry. You sat back and looked at the sky as you ratcheted up the highest vertical drop in the world. You screamed, "I'm gonna die!"

You never felt so alive. And you've been on a quest for speed ever since.





Autosensing 260W power supply
Ample power for options, with a very quiet variable speed fan.

Local bus video and GUI accelerator
Windows fly open. Applications switch instantly. If you're a pixel, it's the only way to fly.

6 full-size ISA slots
give you room for plenty of options.

Compact design
Everything fits into a 17" x 7" x 17" micro-tower enclosure.
"Holds more in less space."
– *PC Magazine*, April 13,1993

Network certified
Every DECpc MT is tested and certified compatible with Novell™, NetWare™ and Digital PATHWORKS™.

intel inside

Wait'll you climb into the-new 486-powered DEC

ocessor choices
86DX – DECpc 433dx MT
86DX2 – DECpc 450d2 MT
86DX2 – DECpc 466d2 MT

Ergonomic styling
allows convenient access to horizontal, front accessible drive bays.

Low emission SVGA monitors
in 4 sizes (14"-19") comply with the most exacting international standards.

Hold on to your hat. The DECpc™ MT is priced like a clone, but it runs like a cyclone. The Windows performance will leave you breathless. The extra features and sleek footprint will floor you. Even the low price may make you a little dizzy. But only for a nanosecond.

"The MT 'towers' over PCs."

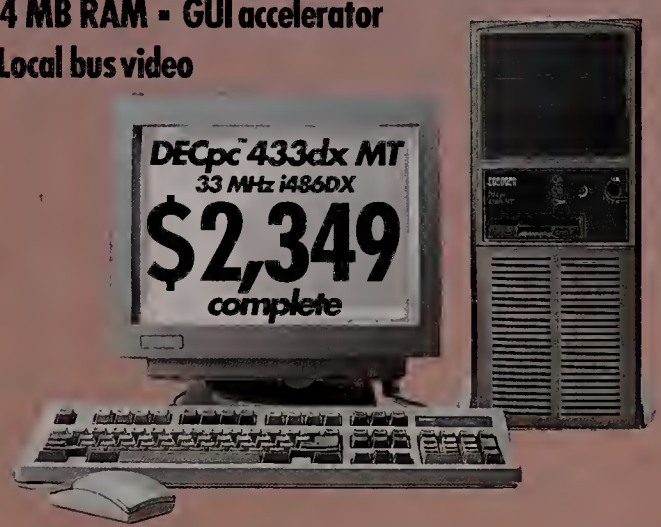
— *Infoworld*, March 8, 1993

Best of all, you can get the MT from the world's fastest growing PC source: Digital. With all the world-class services you'd expect — and more: a one year *on-site* warranty direct from Digital, supported by 35,000 people worldwide. Support for your PC, your software, your network, *everything* — whether or not you bought it from us. Support so good, in fact, that it won *PC Magazine* Reader's Choice Award.

The DECpc MT is one heck of a ride. And with our outstanding support, you always know exactly where you'll end up. So go ahead. Make the call. Then take it for a spin.

Each DECpc MT gives you:

- **6 ISA slots, 5 drive bays • 127 MB hard drive**
- **4 MB RAM • GUI accelerator**
- **Local bus video**



CALL 1-800-332-4429

8:30 a.m. to 8:00 p.m. Mon.-Fri. ET
Please reference BBG when you call

digital™

PUTTING IMAGINATION TO WORK

THE DECpc FAMILY. ONE BREATHTAKING VALUE AFTER ANOTHER.

LP SYSTEMS

Basic Features

- i486 processors
- 4 MB RAM, expandable to 64 MB
- 128 KB external cache memory, expandable to 256 KB
- Local bus video and built-in GUI accelerator
- 512 KB VRAM, expandable to 1 MB
- 127 MB IDE hard drive
- 3.5" 1.44 MB floppy disk drive
- 3 available full ISA slots
- 14" SVGA low emission non-interlaced color monitor
- MS-DOS® 6.0 and Microsoft Windows™ 3.1 installed
- 2-button mouse
- 101-key keyboard
- Low-profile enclosure (3.5" x 16.1" x 15.6")

DECpc 425sx LP

- 25 MHz i486SX

$1,649

DECpc 433sx LP

- 33 MHz i486SX

$1,849

DECpc 433dx LP

- 33 MHz i486DX

$2,099

DECpc 450d2 LP

- 50 MHz i486DX2

$2,249

DECpc 466d2 LP

- 66 MHz i486DX2

$2,549

Lease for as low as $74 a month.

MT SYSTEMS

Basic Features

- i486 processors
- 4 MB RAM, expandable to 64 MB
- 128 KB external cache memory, expandable to 256 KB
- Local bus video and built-in GUI accelerator
- 512 KB VRAM, expandable to 1 MB
- 127 MB IDE hard drive
- 3.5" 1.44 MB floppy disk drive
- 3 available front accessible 5.25" drive bays
- 6 available full ISA slots
- 14" SVGA low emission non-interlaced color monitor
- MS-DOS 6.0 and Microsoft Windows 3.1 installed
- 3-button mouse
- 101-key keyboard
- Compact micro-tower enclosure (17" x 7" x 17")

DECpc 433dx MT

- 33 MHz i486DX

$2,349

DECpc 450d2 MT

- 50 MHz i486DX2

$2,499

DECpc 466d2 MT

- 66 MHz i486DX2

$2,799

Lease for as low as $82 a month.

intel inside

SL NOTEBOOKS

Basic Features

- i386SL and i486SL processors
- Processor upgradable
- 120 MB removable hard drive
- 3.5" 1.44 MB floppy disk drive
- Upgradable LCD screens
- Snap-on trackball
- 2 Type II PCMCIA slots
- MS-DOS, Microsoft Windows, BitFax™/BitCom™ fax/modem software installed
- 6.5 hr. NiMH battery and autosensing AC adapter
- Optional Docking Port and Docking Station
- 80-key keyboard

DECpc 325SL

- 25 MHz i386SL
- 64 KB external cache
- 4 MB RAM expandable to 20 MB
- 9.5" 64-gray supertwist screen
- Size 8.5" x 11.5" x 1.8", 5.9 lb

$2,299

DECpc 325SLC

- 25 MHz i386SL
- 64 KB external cache
- 4 MB RAM expandable to 20 MB
- 9.5" 256-color passive matrix screen
- Size 8.5" x 11.5" x 2.1", 6.9 lb

$2,899

DECpc 425SLC

- 25 MHz i486SL
- 8 KB internal cache
- 4 MB RAM expandable to 32 MB
- 9.5" 64-gray supertwist screen
- Size 8.5" x 11.5" x 1.8", 6.2 lb

$2,499

DECpc 425SLC Premium

- 25 MHz i486SL
- 8 KB internal cache
- 4 MB RAM expandable to 32 MB
- 9.5" 256-color active matrix screen
- Size 8.5" x 11.5" x 2.1", 6.9 lb

$3,999

Lease for as low as $74 a month.

PRINTERS

DECwriter 95

- 24-wire dot matrix
- High resolution at low cost (360 x 360 dpi)
- 13 resident fonts
- Upgrades to 7-color printing

$319

DECmultiJET 2000

- Bubble ink jet technology
- HP™ DeskJet Plus Emulation
- High resolution (300 dpi)
- Sheet feeder built-in

$499

DEClaser 1152

- PostScript Level 2 and HP PCL4
- 17 Adobe PostScript® fonts
- Multiple simultaneous active I/O ports
- 4 pages/minute

$1,299

Take another 10% off these low prices!

Purchase any Digital desktop printer with your DECpc and receive 10% of the price of the printer. (Offer good through 7/3/93; not applicable to Resellers).

France 1-69 87 69 87	U.K. 0800-393200	Germany 0130-7778
Holland 030-832883	Italy 1678-02075	Canada 800-267-6215
Australia 008-021246	New Zealand 0800-800332	Asia 852-311-8321
Brazil 55-11-492-4195	Mexico 52-5-669-0422	Puerto Rico 809-781-0505 xt 8357
Venezuela 58-2-952-4011	Caribbean 305-360-6500	Japan 0120-116004

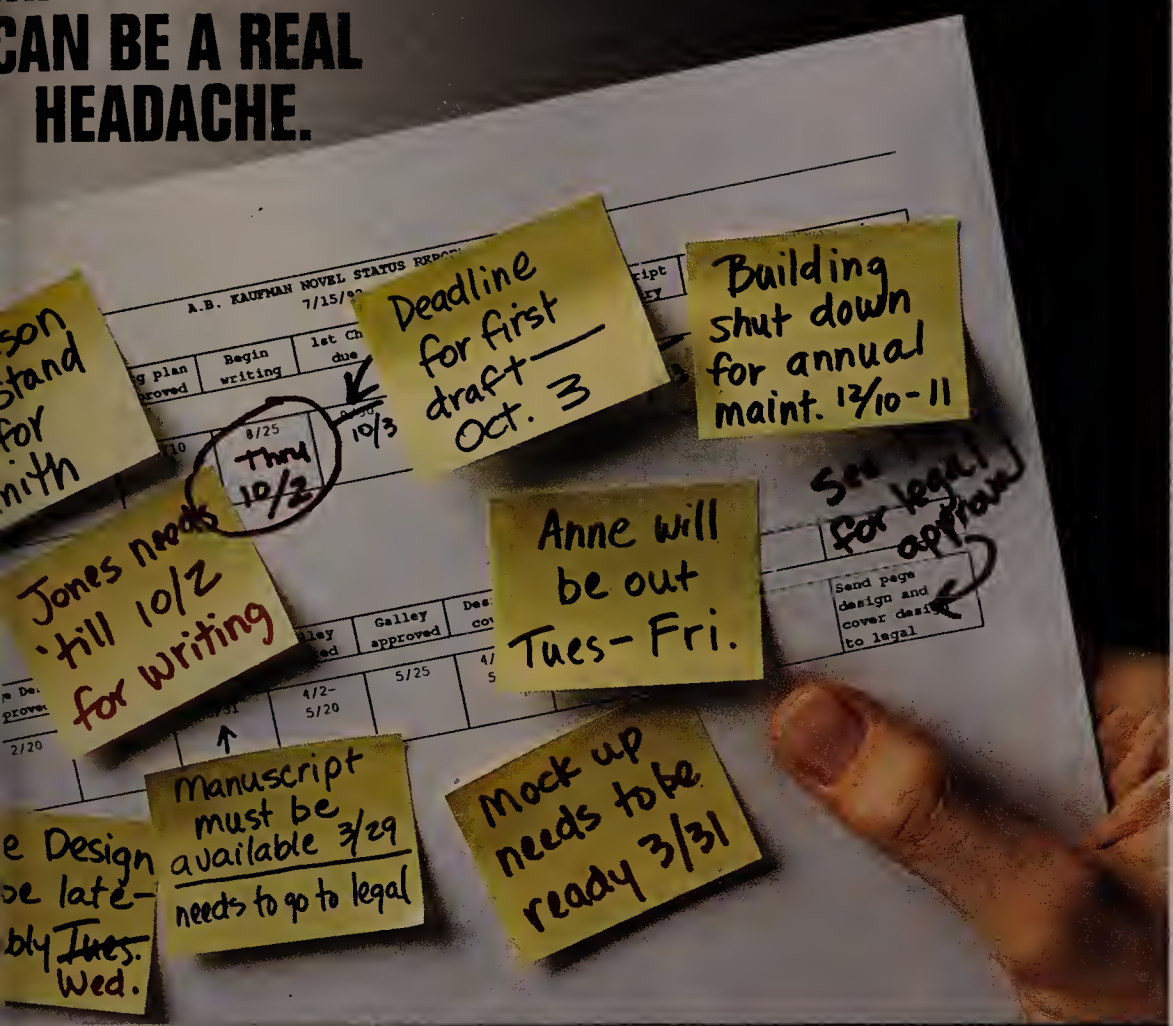
1-800-332-4429

8:30 a.m. to 8:00 p.m. Mon-Fri. ET
Please reference BBG when you call

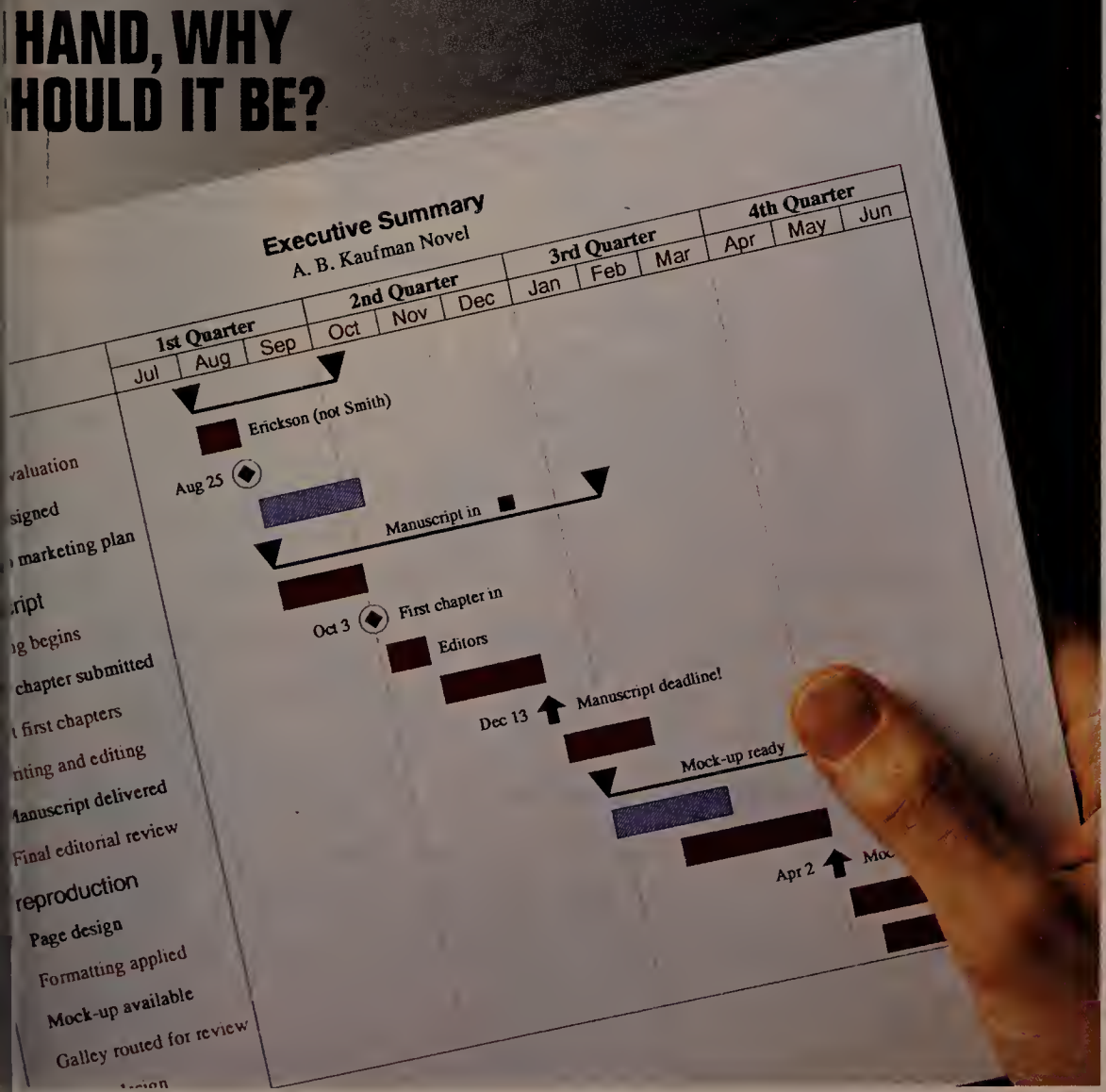
digital

© Digital Equipment Corporation, 1993. Digital, DECpc, DEClaser, DECmultiJET, DECwriter, PATHWORKS, and the DIGITAL Logo are trademarks of Digital Equipment Corporation. HP is a registered trademark of Hewlett-Packard Company. i386, i486, and the Intel Inside Logo are trademarks of Intel Corporation. PostScript is a registered trademark of Adobe Systems, Inc. Windows is a trademark and MS-DOS is a registered trademark of Microsoft Corporation. Novell and NetWare are trademarks of Novell, Inc. BitFax and BitCom are trademarks of Bit Software. Digital believes that the information in this advertisement is accurate as of its publication date; such information is subject to change without notice. Digital is not responsible for any errors. Actual monitor may differ from those shown. Not all products available worldwide.

ON ONE HAND, PROJECT MANAGEMENT CAN BE A REAL HEADACHE.



IN THE OTHER HAND, WHY SHOULD IT BE?



You work hard enough planning your projects; why not let Microsoft® Project 3.0 for Windows™ help you make it easier?

With clear graphs, you'll be able to see and communicate your project even better–from the tiny details to the big picture.

Changes? No problem. For every revision you make, Microsoft Project helps you see how it will affect the entire job.

Assigning a new job? Just click the People button. Want to know who's doing what, when? Microsoft Project can help you keep track of everyone.

And if you need to get off to a fast start, use PlanningWizards to guide you step by step. Soon, you'll have great-looking, easy-to-read reports that make all your plans perfectly clear.

You can even exchange files between Microsoft Project on your PC and your Mac.® Either way, why not plan on the leading project management software? Microsoft Project 3.0 – it takes the pain out of planning.

Microsoft
Making it easier

For more information inside the 50 United States, call (800) 426-9400, Dept. JM2. Outside the U.S. and Canada, call (206) 936-8661. Customers in Canada, call (800) 563-9048. © 1993 Microsoft Corporation. All rights reserved. Printed in the USA. Microsoft is a registered trademark and Windows and the Windows logo are trademarks of Microsoft Corporation. Mac is a registered trademark of Apple Computer, Inc.

CACHES PAY OFF

BY TJ BYERS AND REX FARRANCE **If your system's straining under the load of Windows and other disk-intensive applications, here's how hardware and software caches can help.**

With today's weighty workloads and power-hungry applications, you're undoubtedly searching for anything that can help you work faster. And chances are, overspending your budget for new PCs is not on your list of options. So how do you get the speed you need without shelling out thousands of dollars? You may find the key to next-level speed stored on the hard disk of your current PC.

Disk caching can make a huge difference in the speed of today's applications, regardless of your hard disk's age. And you don't have to use a database program to benefit; *Windows*, with its heavy use of virtual memory, makes big hard disk demands. Any system—even the hottest desktop iron—can benefit from disk caching. By reading more data than an application requests, the data the app subsequently requests is often already in the cache. Because getting the data from the cache is far faster than getting it from the disk, system and application performance improves.

But what's the best cache choice on the desktop: hardware or software? Is a costly caching IDE disk controller—which you have to install in an expansion slot in your PC—worth the investment? Or will a less expensive, easier-to-install software cache, such as *Super PC-Kwik*, do the job just as well? And what about SmartDrive 4.0, the caching utility that's free with *Windows 3.1* and DOS 6.0? How does it stack up against its hardware and software competition?

The Cost of Cache

To suit your needs, you have to find just the right fit in three important areas: cost, speed, and usability. Cost is self-explanatory. The whole idea in using disk caching products is to get maximum

A B C D
1
2
3
4
LEWIS

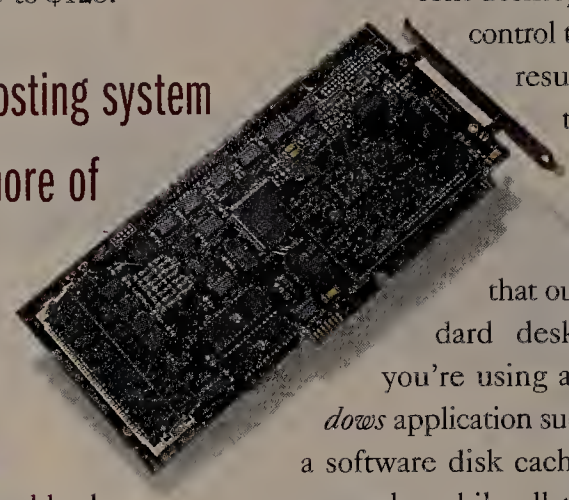
bang for the buck—and the fewer bucks you need to spend, the better.

If you're looking for the lowest price you can find, The Aldridge Company's *Cache86* and HyperWare's shareware *HyperDisk* are priced at a mere $50. Microsoft includes SmartDrive 4.0 with *Windows 3.1*, so you may already have it; you can get SmartDrive 4.1 for the cost of a DOS 6.0 upgrade. The most expensive software products here are Central Point's PC Cache (included in *PC Tools*) and Symantec's NCache (included in *The Norton Utilities*). Both have list prices of $179, but they also come with data protection, data recovery, file management, system information, and benchmarking utilities that provide their underlying appeal. *PC Tools* throws in other extras, such as excellent antivirus and backup utilities, and a remote computing program.

Naturally you'll pay considerably higher prices for the hardware caching products. List prices run as high as $595 for Perceptive Solutions' WinStore controller with its starting capability to cache 1MB of data, and as low as $220 for UltraStor's Ultra 15C in its basic 512K configuration.

You should be able to find all these products discounted. For example, you can buy *The Norton Utilities* or *PC Tools* through mail-order software and hardware houses for around $115 to $125.

For a 4MB Windows PC, boosting system RAM to 8MB may provide more of a speedup than adding a 4MB caching controller.



Searching for Fast Cache

While costs vary considerably, the PC World Test Center detected minimal overall speed differences between hardware and software caches. Intriguingly, the software caches took a slim 4 percent edge. Why? For one thing, software caches use system RAM instead of dedicated cache RAM plugged into an expansion slot, so cached information doesn't have to cross the I/O bus.

The difference in the speed of the products was similarly small, between 5 and 10 percent—which means it wouldn't be noticeable in everyday work. We tested IDE controllers because IDE drives are the current desktop drives of choice, but control tests indicate that their results are consistent with those for ESDI and SCSI caching disk controllers.

It's important to note that our tests employed standard desktop applications. If you're using a non-DOS, non-*Windows* application such as Novell NetWare, a software disk cache may not work. For example, while all these software caches work on Novell client nodes, none support the Novell server. But many hardware caching disk controllers do, including the Alpha Research Model S4251 and UltraStor Ultra 15C listed here.

Our technicians used default installations on our 25-MHz 386DX Compaq Deskpro 3/25i for all the software products, on the assumption that most users would do the same. Our test system was equipped with 8MB of RAM. Hardware caching controllers were tested with 2.5MB to 4.5MB of cache, and with software from 256K to 7MB. We found that most of the benefit came with the first cache increments; each larger increment, while beneficial, offered an increasingly diminished performance benefit. For example, the speed difference between the same controllers using 2MB to 4MB of cache was a negligible 1 to 4 percent.

Cache Decisions

Remember that all caches use some kind of RAM. Hardware caches provide dedicated memory stores, and software caches borrow from system RAM. Generally speaking, a caching IDE controller will cost from $150 to $300 for the controller itself. Unless you have an older system or a system that requires proprietary RAM, these caching disk controllers and your system both use the same standard single in-line memory modules (SIMMs). So you'll pay a street price of $30 to $40 per megabyte to add RAM to either. And if you want to achieve an optimum performance boost, you'll probably need to add

Playing It Safe With Delayed Writes

Both hardware and software caches always cache reads on cached disks. But they don't always cache their writes. In the write-through mode—the safer of the two—data is written to the disk immediately. The second mode, called delayed write, staged write, or write-back, postpones writing to the disk until there's no impending hard disk or CPU activity. Use of this mode can improve data throughput at the time of the write by as much as 30 percent, depending on the application.

Timing the Writes

Some caches, such as DOS's SmartDrive, constantly monitor system activity and write to the disk whenever an opportunity occurs. Others, like *Fast*, simply wait a predetermined time—five seconds, for example—in the hope that system activity will have subsided by the time the write is forced. Other products, such as Aldridge's *Cache86*, accomplish both of those tasks.

The danger in using delayed writes is that data has to reside in RAM during the wait, even though the cache has given the CPU the message that the data has been written. So the data is susceptible to loss should power fail. You can also lose information if the system is turned off or rebooted before the data is written to disk.

Most software caches attempt to avoid data loss by trapping the <Ctrl>-<Alt>-<Delete> keystroke sequence and flushing the buffers before a reboot. Some give you a hot-key option, and you can flush your cache with a keystroke combination—if you remember to use it. However, these features don't help you with a power failure or an accidental flick of the reset switch. And in a case where you have set up your hardware caching controller to use delayed writes, you don't even have a hot-key option for flushing the cache.

Caching software and hardware vendors argue that delayed writes actually lessen the amount of time your data is in jeopardy by speeding up your system overall. Whether or not you buy that argument, there's no question that if your data has not been written to disk and you lose power, you'll lose the data as well.

some RAM—especially if you have a system with only 2MB or so of RAM.

It's important to decide where the added RAM will do the most good. If you have a system with 4MB of RAM and you're a *Windows* user who runs multiple applications and does a lot of task switching and background processing, boosting system RAM to 8MB will provide much more of a speedup than adding a 4MB caching disk controller. And you won't have to pay an extra $200 or more for the controller card. It is important to note, however, that older, slower machines will benefit much more from hardware than software caching for two reasons: The CPU is slower, and in PC-XT class and earlier systems specifically, your total RAM is too limited to leave enough space to cache in. Of course, with many of these older systems, the cost of a hardware caching controller may exceed the value of the PC.

Cache Usability

Usability is essential with any product, and it starts with an easy installation and setup, which an installation program should facilitate. Everyday usability features are even more important. Many software caches offer hot-key options that let you enable and disable the cache with a keystroke, switch performance-enhancing delayed writes on or off, or flush out the cache to make sure all the data is written to disk before shutting down. The latter can be important if you're using a cache with delayed writes enabled. (For more details see the sidebar, "Playing It Safe With Delayed Writes.")

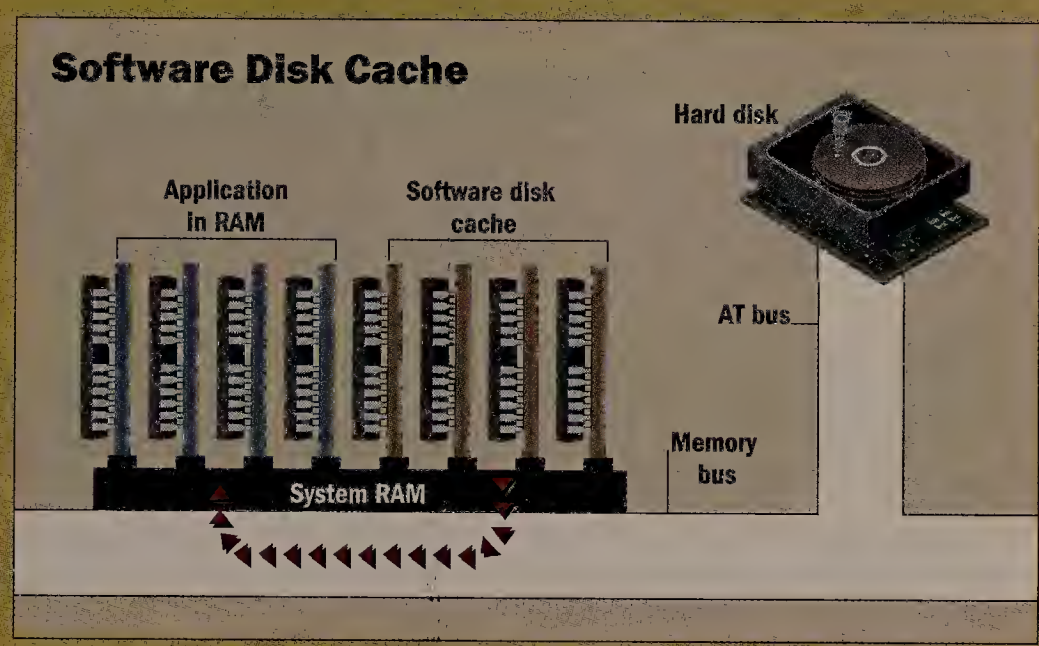
Installing a caching disk controller requires some work. For starters, you have to open the PC's cover and plug the card into an expansion slot on the system board. Usually you have to run the computer's setup program to disable the PC's built-in IDE connector. Then you have to select the correct drive type to correspond to your controller. You attach the drive cables, set a jumper or two, and away you go. It's not really difficult, but the process can be intimidating for the less technically inclined.

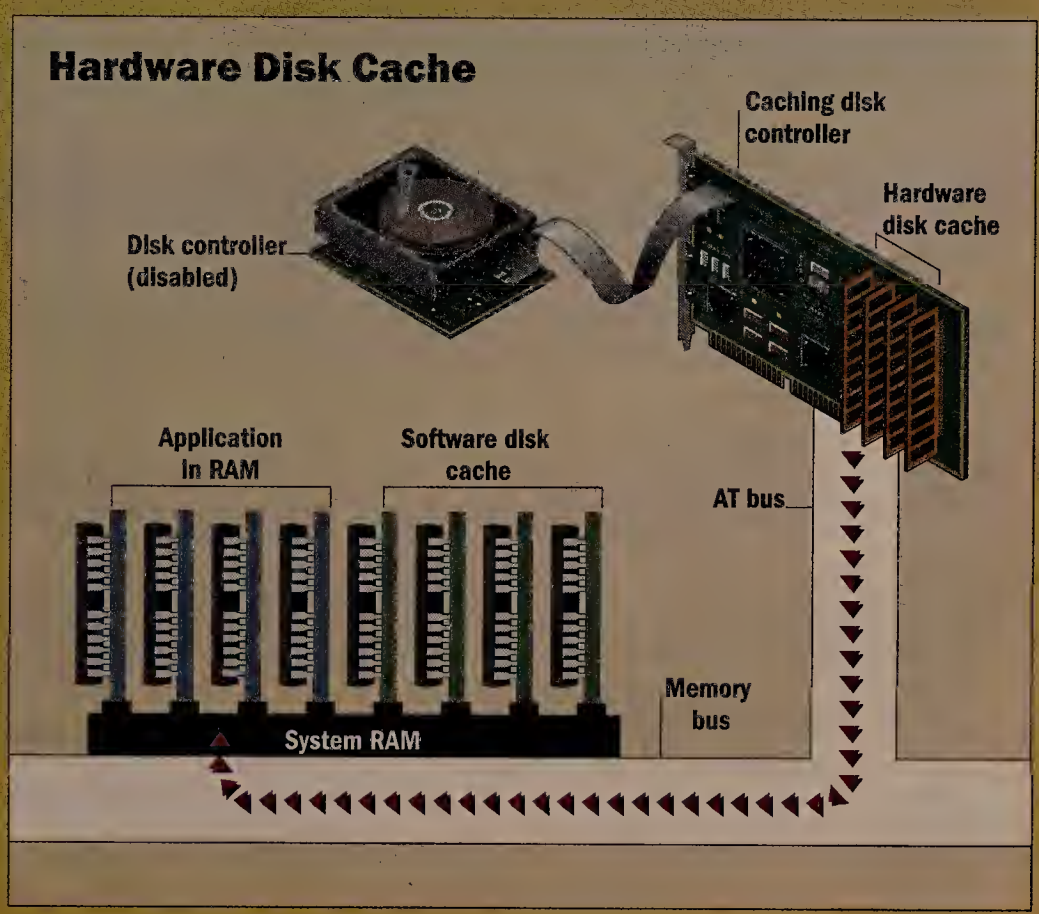
Software installations are a snap. Usually all you have to do is run an installation program, which transfers the program from floppies to the hard disk. Ideally, the program should allow you to adjust your CONFIG.SYS and AUTOEXEC.BAT start-up files. If your program doesn't complete the whole job, you will have to use an ASCII editor and make the final adjustments yourself. This isn't terribly challenging, but it can be an annoyance. The best installation utilities are menu-driven, giving you the opportunity to set caching parameters during installation.

The easiest program to install is Lucid's *Lightning for Windows*. It has an accessible menu interface, and it's smart enough to default to the right choices in most cases. The only thing it doesn't do by itself is adjust the number of DOS buffers. All the software caches advise you to reduce the number of DOS buffers in the CONFIG.SYS file to ten or less, but only two, *Flash* from Software Matters and Golden

Software and Hardware Cache Hits

The software disk cache (top) uses system RAM for caching. When requested data is in the cache (a hit), it traverses only the memory bus to get to application RAM. The hardware cache (bottom) has its own dedicated cache RAM, but delivering a cache hit takes a bit longer because the data must travel on the slower AT bus before reaching the memory bus and application RAM.





Bow's *Vcache*, actually do it. The others force you to edit the file manually.

Unfortunately, neither *Flash* nor *Vcache* deletes existing software caches; having two running at the same time noticeably reduces system speed, and if you've installed *Windows*, you probably already have SmartDrive running. An advantage of caching disk controllers is that they do not need to delete software caches.

The most difficult software cache to install is The Aldridge Company's *Cache86*. It's the only one we found that lacks an installation program. Besides having to install the cache manually, you need complete firsthand knowledge of the system's environment, as there are no defaults.

Cache Considerations

As you can see, each class of products provides benefits and drawbacks. Software caches are a hair faster, a lot cheaper, and can cache more drives. Hardware caches are generally better behaved and support more applications and operating systems.

What's more, hardware caches don't eat up conventional RAM; the Alpha Research and Corporate Systems Center cards require just 1K; the Perceptive Solutions and UltraStor products use none. The IDE disk controller cards we looked at plug into 16-bit ISA expansion slots and use standard SIMMs to provide most of their cache capacity, although the two Perceptive Solutions controllers also have 512K of cache RAM soldered on.

Most of the software products can cache a variety of drive types in addition to ESDI, IDE, MFM, RLL, and SCSI Winchester drives. They will cache floppy drives and a range of SCSI removable-media drives, including those of hard disks, magneto-optical hard disks, and CD ROM drives. Software products cache instructions and data in extended RAM above 1MB but often

Software Caching Takes Less Cash

● = Yes ○ = No
n/a = not applicable

Vendor	Product	Price	STANDARD FEATURES: Cache size (installed hardware or software default with 8MB system RAM)	STANDARD FEATURES: Maximum cache size (MB)	INSTALLATION: Installation program	INSTALLATION: Removes existing software cache	INSTALLATION: Conventional RAM required[1]	INSTALLATION: Recognizes system RAM size	INSTALLATION: Recognizes system RAM type	HOT-KEYS: Enables/disables cache	HOT-KEYS: Toggles write-through/write delay	HOT-KEYS: Flushes cache	DRIVES SUPPORTED: Maximum number of drives
HARDWARE													
Alpha Research 512/836-0709	Model S425I	$289	none[2]	16	●	n/a	1K	n/a	n/a	○	●	○	4
Corporate Systems Center 408/737-7312	FastCache 64	$149	1MB	64	●	n/a	1K	n/a	n/a	○	○	○	6
Perceptive Solutions 800/486-3278	QuickCache	$395	512K	8.5	●	n/a	none	n/a	n/a	○	○	○	4
	WinStore	$595[6]	512K[7]	8.5[7]	●	n/a	none	n/a	n/a	○	○	○	4
UltraStor 714/581-4100	Ultra 15C	$220	512K	8	●	n/a	none	n/a	n/a	○	○	○	4
SOFTWARE													
The Aldridge Co. 800/548-5019	Cache86	$50	none	8[8]	○	○	13K	○	○	●	●	●	24
Bloc Publishing 305/445-0903	Fast 4.13	$80	25% of RAM	8[8]	●	●	26K	○	○	●	●	●	24
Central Point Software 800/445-4208	PC Tools 8.0 PC Cache	$179	256K	32	●	○	17K	●	●	○	○	●	26
Golden Bow Systems 800/284-3269	Vcache 6.00	$70	avail. ext. or exp. RAM	8	●	○	37K	●	○	○	○	○	16
HyperWare 415/882-1740	HyperDisk 4.50	$50	avail. ext. or exp. RAM	63	●	●	29K	●	●	●	●	●	20[9]
Lucid 800/967-5550	Lightning for Windows	$130	3MB	8	●	●	90K	●	●	●	●	●	26
Microsoft 206/882-8080	Windows 3.1 SmartDrive 4.0[10]	$130	2MB	32	●	○	26K	●	○	○	○	○	26
PC-Kwik 503/644-5644	Super PC-Kwik 5.01	$80	avail. ext. or exp. RAM	16	●	●	48K	●	●	○	●	○	26
Software Matters 317/253-8088	Flash 9.0	$70	avail. ext. or exp. RAM	32	●	●	4K	●	●	●	●	●	26
Symantec 800/441-7230	Norton Utilities 6.01 NCache	$179	avail. ext. or exp. RAM	23	●	●	33K	●	●	○	○	○	26

[1] Software conventional RAM requirements vary with cache size.
[2] Sold without memory; needs 1MB to function.
[3] Controller support only, not cached.
[4] Can select inactive CPU or time-delayed write at setup.
[5] When Hot-Fix feature is enabled.
[6] Includes Stac hardware real-time data compression (approximately doubles size of hard drive and cache space). Software version available for $100 less.
[7] Caches twice as much compressed data.
[8] 8MB maximum for extended memory, 4MB maximum for expanded memory.
[9] Supports 10 hard and 10 floppy drives.

require conventional RAM in their default configurations. Lucid's *Lightning for Windows* takes a hefty 90K. You can usually load the drivers in upper memory, but if you also have network or CD ROM drive drivers to contend with, you may be out of upper memory. In that case, the bite will come from your 640K of conventional RAM. That adds up to problems executing RAM-hungry applications.

It's also important to realize that software caches don't always work with every application. For example, many software cache vendors warn against use with Quarterdeck's *QEMM-386* memory manager in its popular Stealth mode. And certain caches, such as Aldridge's *Cache86*, Bloc's *Fast*, and *The Norton Utilities 6.01*'s NCache, warn against use with AddStor's real-time disk compression utility *SuperStor*. (*Norton Utilities 7.0*'s cache, which will be available by the time you read this, is compatible with *SuperStor*; Stac Electronics' *Stacker*; and DOS 6.0's DoubleSpace data compression program.)

Hardware caching controllers, on the other hand, rarely conflict with software programs. One IDE caching controller, WinStore from Perceptive Solutions, even comes with Stac's hardware data compression integrated on the controller.

	INCLUDED UTILITIES						DELAYED WRITES				
	Floppy	Selective drive caching	Keyboard accelerator	Screen accelerator	Screen saver	Data recovery library	Time delay	Writes when CPU is inactive	Warm boot protection	Verify	Reader service number
625	○[3]	○	○	○	○	○	●	●[4]	○	●[5]	
626	●	○	○	○	○	○	○	○	○	○	
627	●	●	○	○	○	○	○	●	○	○	
627	●	●	○	○	○	○	○	●	○	○	
628	●	●	○	○	○	○	○	●	○	○	
629	○	○	○	○	○	○	●	●	●	○	
630	○	○	○	○	○	○	●	●	●	○	
631	●	●	●	○	●	●	●	●	●	○	
632	●	●	●	●	○	○	●	●	●	○	
633	●	●	●	●	●	○	●	●	●	●	
634	●	●	○	○	●	○	●	●	●	○	
635	●	●	○	○	○	○	○	●	●	○	
636	●	●	○	○	○	○	●	○	●	○	
637	●	●	●	●	○	○	●	●	●	●	
638	●	●	●	○	○	●	●	●	●	○	

[10] DOS 6.0 includes a later version of SmartDrive.

For more information about all products in this table, circle reader service no. 901.

Picking Your Winner

For most desktop users, a software cache is the best choice, primarily because of the price advantage and easy installation. SmartDrive comes free with DOS and *Windows*, it's fast, and if you're like most users, it's all you'll ever need. But its installation does leave something to be desired: *Windows* and DOS 6.0 install it automatically but don't offer guidance on choosing a configuration. (A rough rule of thumb for users with 4MB of RAM is to set up a 1MB cache; if you have 8MB, SmartDrive 4.0's default 2MB cache should be fine.) *Windows* users with high memory to spare will like *Lightning for Windows*. It's easy to install and has an excellent toolbox of incidental *Windows* utilities. *Super PC-Kwik 5.01* is a tried-and-true program with a devoted following, a reputation for compatibility, and an easy installation. You can also buy it with *Super PC-Kwik Power Pak 3.0* for a nominal additional fee and get a number of extra utilities, such as keyboard and DOS screen accelerators and a print spooler.

Any of the caching disk controllers here can make a good alternative, especially if you have to run applications that need lots of RAM and your system is burdened with device drivers. If you're using a utility that software caches can't handle, a hardware solution may be your only disk-caching choice. The CSC Fastcache 64 is the least expensive of the lot. The Alpha Research S425I and UltraStor Ultra 15C are the only ones that will run on a Novell NetWare file server. If price isn't a big concern, Perceptive Solutions' WinStore board provides efficient disk caching and can nearly double your storage and disk cache capacity with its hardware real-time data compression.

While there is no universal answer, disk caching can pay off for almost every desktop user. Apart from exceptions dictated by occasional compatibility problems and unusually RAM-hungry applications, software caches are the most attractive solution. Bottom line? You probably already have one of the best disk caches you can get your hands on—SmartDrive. Just make sure you have it installed and configured properly.

TJ Byers is a contributing editor and Rex Farrance an associate editor for PC World. *They can be reached as TJBYERS and REXFARRANC on PC World Online (see page 10 for more information).*

We Don't Make Lots Of Money

We Make Lots of Software!

"DesignCAD...is a case study of what can be achieved when a software producer commits to excellence. A great interface, logical commands, and vertical integration into 3D combine with a great price ($349) to make...a superior buy once again." - PC Magazine March 1993.

Typical DesignCAD 3D drawing. Courtesy Old World Graphics, Philadelphia, PA.

DesignCAD Release 6.0 added hundreds of new features and improvements. For this reason, our dealers and distributors felt a price increase was in order. Some complained they made more money selling competing products. It's always been our belief that a computer-aided-design (CAD) system shouldn't cost more than a good word processor. In the finest American Tradition we said, "Aw...What the Heck. Let's see the other guys beat our deal! Let's keep the price low, and sell big quantities."

DesignCAD 2D Still $349 suggested asking price

DesignCAD 2D Release 6 offers an amazing amount of CAD power for the low price. Features such as a built-in programming language and an on-line manual are standard. Distance,bearing, and center-of-gravity measurements are just a few of the advanced calculation capabilities available. DesignCAD 2D is not a low performance CAD system. It's only low priced!

Who Uses DesignCAD?

Studies indicate the average DesignCAD purchaser is a Fortune 1000 company with more than 500 employees and 100 million dollars per year in total sales. However, due to the low price, a large number of DesignCADs are sold to "average" computer users for ordinary projects. DesignCAD gives you the power and sophistication to complete **any** type of project

What Can You Do With DesignCAD?

Anything! Design your own home, porch, or room addition. Landscape your home. Create technical drawings, do cross-stitch needlework patterns, stain glass window designs, model airplane designs, futuristic vehicles, or design small thermonuclear devices (not a recommended use). Design real-life space vehicles, such as the space shuttle. Do all types of space management and facilities designs. DesignCAD eliminates the age-old drafting board.

The uses for DesignCAD 2D are only limited by YOUR imagination!

What about 3D?

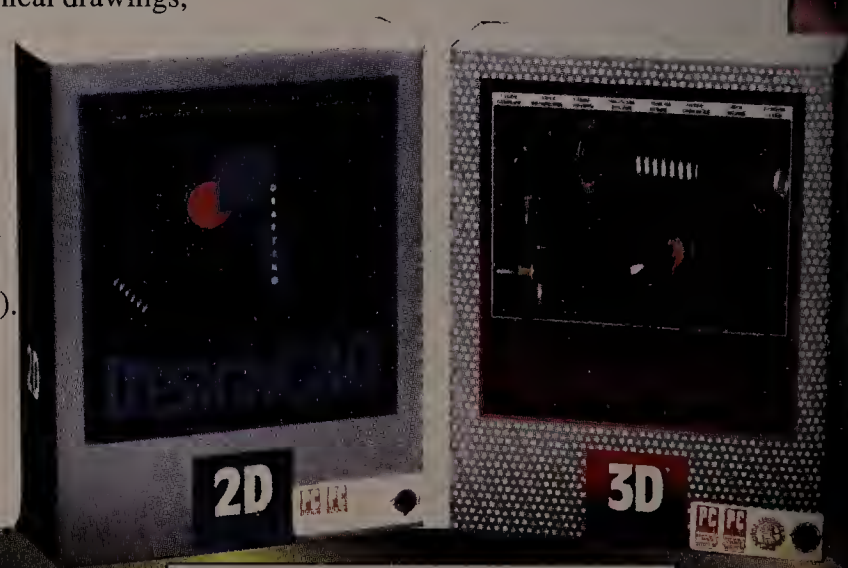
We've got it! We offer DesignCAD 3D for only $499. DesignCAD 3D offers power and features not found on systems costing thousands of dollars more.

Which Do I Buy?

In general, DesignCAD 2D is the best choice for all drafting applications. DesignCAD 3D is best used for simulation; to see what something looks like before it's built. If you have questions about which program is best suited to your needs contact our Sales Department.

Do You Offer a Bundle?

Yes, we offer DesignCAD-The Professional Series. This package combines DesignCAD 2D, DesignCAD 3D, ScanPro Raster-to-Vector conversion software, and 6700 symbols all in one complete package. For the name of your nearest dealer or for information and a **FREE** demo disk, fax or call the numbers below.

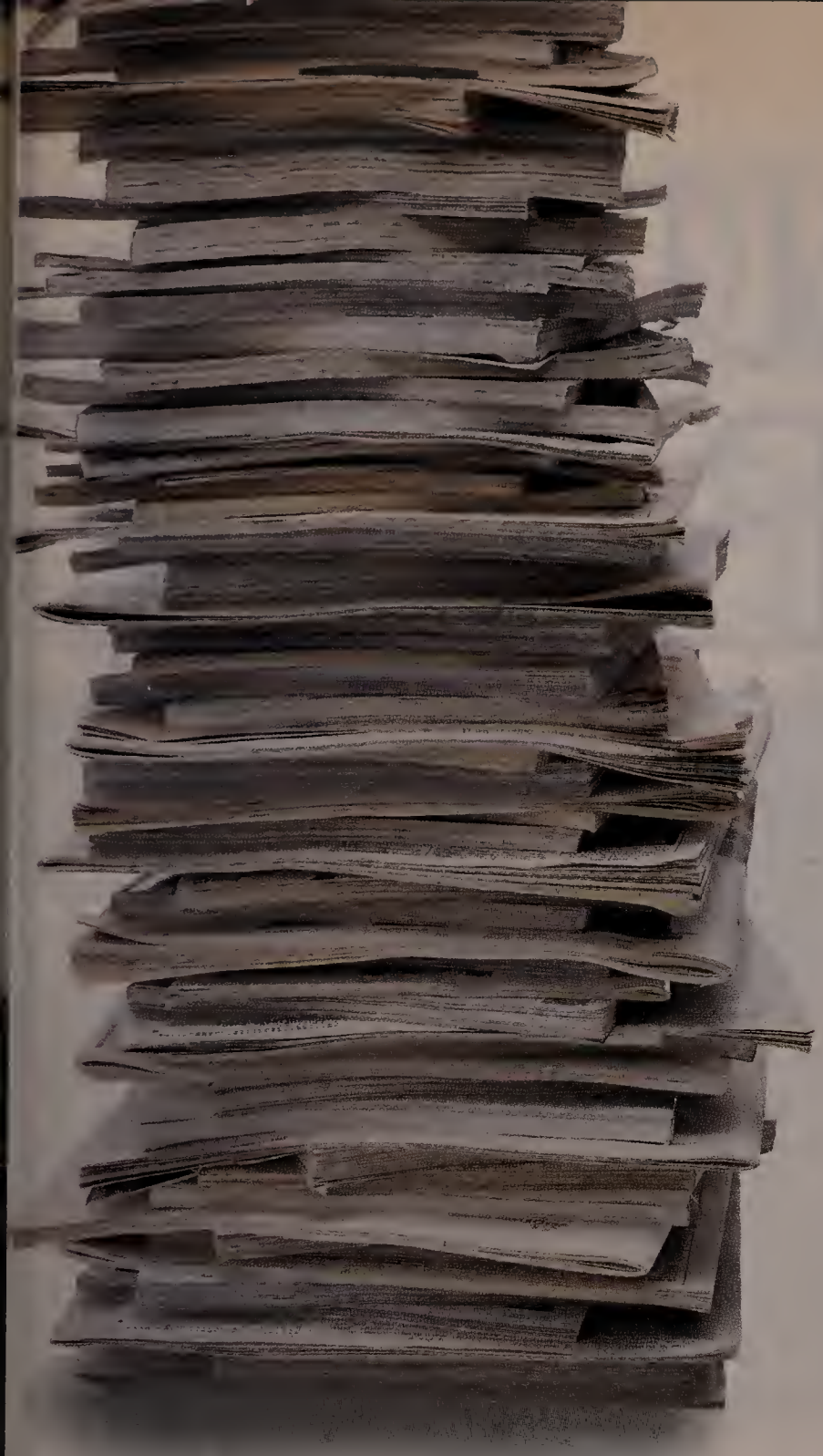


American Small Business Computers, Inc.
One American Way
Pryor, OK 74361 USA

In Europe:
American Small Business Computers, Europe
102 Rue La Fontaine
75016 Paris FRANCE TEL: 331 4520 6540 • FAX: 331 4520 6539

Tel: (918) 825-4844
Fax: (918) 825-6359

Circle 1 on reader service card



IT'S NOT HOW MUCH YOU READ.

You can read a knee-high stack of computer magazines each month and still not find the depth and breadth of news and information you'll discover each week in the pages of *Computerworld*.

As the only weekly newspaper for IS professionals, *Computerworld* is filled with up-to-the-minute articles on topics ranging from products and people to trends and technology. We cover it all—PCs, workstations, mainframes, client/server computing, networking, communications, open systems, languages, industry news, and more.

It's everything you need to know to get an edge on the competition.

No wonder over 138,000 IS professionals pay to subscribe to *Computerworld* every week. And so should you.

That's why we're making a special offer to *PC World* readers who've never subscribed to *Computerworld* before.

IT'S WHAT YOU READ.

Order a trial subscription today, and we'll send you 6 complimentary issues. If you like *Computerworld*, pay just $29.95 for 45 more issues (51 in all). If you choose not to subscribe, simply write cancel on the invoice and return it to us. You owe nothing. The trial issues are yours to keep.

Call us toll-free at **1-800-343-6474**. Or use the postage-paid subscription card bound into this issue. And get your own copy of *Computerworld*.

Then you can spend less time reading about the world of information systems. And more time conquering it.

The Newspaper of IS

Beauty And dBASE.

NEW UPGRADE 2.0

For millions of dBASE developers, this is a fairy tale come true: new CA-dBFast™ 2.0, the first and only dBASE-compatible database and language for Windows.

MICROSOFT WINDOWS COMPATIBLE

CA-dBFast meets two giant needs: moving existing dBASE applications to Windows *and* developing dazzling new applications in record time. It's the one solution that lets you take advantage of Windows while protecting the huge investment you've made in Xbase technology.

With CA-dBFast 2.0, you get a proven, stable environment that's more visual and more intuitive than anything you've ever used. And there's no need for Microsoft's confusing, intimidating SDK, so creating applications with CA-dBFast is – true to its name – fast.

CA-dBFast includes Windows interface objects for pull-down menus, push buttons, radio buttons, check boxes, scrolling list boxes, bit-mapped graphics and more.

CA-dBFast's report writer, CA-RET, lets you mix text, graphics and data to produce great-looking reports in minutes.

The Visual Application Designer (VAD) makes creating pull-down menus, push buttons, radio buttons, check boxes, scrolling list boxes and other Windows objects as easy as "point and click" or "drag and drop." The VAD generates the required source code, saving you hours of complex programming. You also get a debugger that's so advanced it lets you watch your source code execute at run time – even Single Step through execution.

CA-dBFast 2.0 also includes CA-RET – an outstanding Windows-based report writer that lets you mix text, graphics and data on the same report in a full WYSIWYG environment.

Creating great-looking tabular reports, form letters and labels is as easy as using a word processor.

FOR A FREE DEMO DISK, CALL 1-800 CALL CAI, Ext. 190.

With CA-dBFast applications, there are no license fees, royalties or key diskettes to bother with. And recipients of runtime programs don't need CA-dBFast to run the application – just Windows. CA-dBFast is also compatible with CA-CLIPPER, dBASE III Plus, dBASE IV, and FoxBASE.

So whether you want to wake up old applications or build brilliant new ones, there's only one way to marry Windows beauty and Xbase power.

Check out CA-dBFast today.

New CA-dBFast Release 2.0.

© Computer Associates International, Inc., One Computer Associates Plaza, Islandia, NY 11788-7000. All product names referenced herein are trademarks of their respective companies.

Circle 26 on reader service card

How To Manage The Future.

The Ultimate Combination Of Power And Ease-Of-Use. Now Available For Both Windows *And* OS/2.

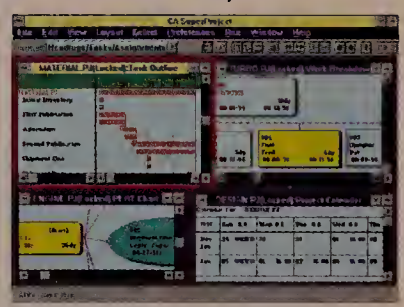
Introducing the first project manager your entire company can use.

1992 W 100 WINDOWS MAGAZINE ANNUAL WIN AWARD

For power users, there are dozens of new features, functions and an internal development language that makes creating advanced macros quick and easy.

For beginners, the easiest, friendliest interface and shortest learning curve in the industry.

The new graphics and reporting options will make every user look like a genius. And since it runs under Windows and OS/2, you won't be burning any bridges.



MICROSOFT WINDOWS COMPATIBLE

Buy one version, get the other FREE.

FOR A FREE DEMO DISK CALL 1-800 CALL CAI EXT. 240.

Free Demo Disk

Call today to test-drive the award-wining project management software that can help you manage the future.

Today.

COMPUTER ASSOCIATES®
Software superior by design.

New CA-SuperProject 3.0.

© Computer Associates International, Inc., One Computer Associates Plaza, Islandia, NY 11788-7000. All product names referenced herein are trademarks of their respective companies.

Circle 78 on reader service card

Outrageous Upgrade.

$199
Competitive Upgrade Offer!

New Competitive Upgrade Can Save dBASE, FoxPro, Paradox, Access And ARAGO Users Up To $1,291!

$199 Includes Your Choice Of Any One Of These Absolutely FREE!
Offer Good For Users Of Any Competitive DBMS – Call Today!

Over 550 time-saving, problem-solving functions in one high-performance package. Raise your productivity with this valuable library.

Compile almost any dBASE IV application in three easy steps – and produce executable (.EXE) files with the efficiency of CA-Clipper.

dBASE apps come alive with new CA-dBFast 2.0 – the first dBASE-compatible database and language for Windows.

The Complete, Professional Programming Environment.

CA-Clipper® 5.2 is a robust language, an efficient linker, a flexible preprocessor and a high-performance compiler. It includes: an editor, debugger and make utility for creating PC and LAN-based applications.

Faster Access, Faster Screen Writes, Faster Performance.

Address up to 32 megabytes of virtual memory – with shorter access times. New Expanded Memory System (EMS) capabilities including LIM 4.0 support, plus a Virtual Memory Manager that uses dynamic overlays to let you exceed available RAM.

New RDDs For FoxPro, Paradox and dBASE IV.

Replaceable database drivers for all the most popular development systems. Plus you can customize Clipper with user-defined commands and functions. And seamlessly integrate modules from languages such as C, Assembly, dBASE and Pascal. There are no runtime fees, no additional licenses, no LanPaks.

So what are you waiting for?

Call right now and upgrade to the new standard in Xbase development.

COMPUTER ASSOCIATES®
Software superior by design.

Feature	CA-Clipper	FoxPro	dBASE IV
Lexical Variable Scoping	YES	NO	NO
User-defined Commands	YES	NO	NO
Code Blocks	YES	NO	NO
Nested Multidimensional Arrays	YES	NO	NO
Predefined Object Classes	YES	NO	NO
Variables Modifiable in Debugger	YES	NO	NO
Customizable Reactive Error Handling	YES	NO	NO
Reads and Writes FoxPro (.CDX) Files	YES	YES	NO
Reads and Writes dBASE IV (.MDX) Files	YES	NO	YES
Reads and Writes Paradox (.DB/.PX) Files	YES	NO	NO

Comparison based on FoxPro Version 2.5 for DOS and dBASE IV Version 1.5.

DBA readers rated CA-Clipper 5.01 Best Development Language, Best Xbase Compiler and Best Development Product.

PC Magazine Editor's Choice for Xbase Development.

DBMS Reader's Choice winner for client/server development system.

SEE YOUR LOCAL DEALER TODAY OR CALL **1-800 CALL CAI** EXT. 176.
Operators are standing by to take your order. Offer good for a limited time only, so don't wait. Call today!

New CA-Clipper® 5.2.

© Computer Associates International, Inc., One Computer Associates Plaza, Islandia, NY 11788-7000. 1-800-225-5224. All product names referenced herein are trademarks of their respective companies.

Circle 39 on reader service card

The information service that's more than a retriever. It's your own personal bloodhound.

Dow Jones News/Retrieval is not only loyal, it's extraordinarily obedient. Not only will it fetch facts for you, but all on its own it will relentlessly — and continuously — track down exactly the news and information you need.

The way it works is simple. With just a few keystrokes, you can set up separate electronic folders for the topics you want to be kept current on. Then News/Retrieval will automatically search through a multitude of Dow Jones news sources. And feed your electronic folders a steady stream of timely, preselected news, which you can read at your convenience.

All of it gathered while you're attending a meeting or writing a report.

*Just $29.95 gets you started and includes three free hours.**

For more information, call
1-800-522-3567, Ext. 295.

So you can spend your time actually using the information, instead of gathering it.

Up-to-the-second information that's drawn from our proprietary newswires, including the Dow Jones News Service and the Capital Markets Report, plus PR Newswire, BusinessWire and the full text of *The Wall Street Journal*. As well as hundreds of local, regional and national business publications.

In addition to the news, you'll also have access to a wealth of historical business and financial data.

To send News/Retrieval chasing after the news you need, simply call our toll-free number.

DOW JONES NEWS/RETRIEVAL®
The lifeblood of business.℠
Another Service from Dow Jones Information Services.

*One-time offer to new U.S. members only. Free time is per account and must be used within 30 days after receipt of password. Certain data bases have charges in addition to usage fees, which are excluded from the free-time offer.
Dow Jones News/Retrieval and Dow Jones News Service are registered service marks, Capital Markets Report is a service mark and *The Wall Street Journal* is a registered trademark of Dow Jones & Company, Inc.
© 1992 Dow Jones & Company, Inc. All Rights Reserved.

Here's How

Contents: Spreadsheets 224 | Word Processing 230 | Windows 236 |

HELP LINE Q & A

TIP OF THE MONTH

TERMINAL AUTO-DIALING: *Windows* can use your modem to dial the phone for you. Select Program Manager's StartUp group. Press <Alt>-FN<Enter><Tab>, type PROGMAN-.EXE, enter an unused shortcut key (we'll use Z), and press <Enter>. In Accessories, click on Terminal, press <Alt>-<Enter>, enter T for the shortcut key, and press <Enter>. Run Terminal. Select *Settings • Communications,* your modem's COM port, its baud rate, and *OK.* Select *Settings • Modem Commands,* and after ATDT, add the number, if any, for an outside line and a comma. Save the file as Dial, and exit. Highlight a phone number in an app. Run Accessories' Recorder, and select *Macro • Record.* Type Autodial, press <Tab>D, and ensure only Ctrl is checked. From the Playback To list, select *Any Application* and ensure only Enable Shortcut Keys is checked. From the Record Mouse list, select *Ignore Mouse.* Select *Start.* Switch back to the app. Press <Alt>EC<Ctrl>-<Alt>-Z<Ctrl>-<Alt>-T<Alt>FODial <Enter><Alt>SN<Ctrl>-V<Enter><Alt>PD. Click *Cancel.* Switch to Recorder. Save the macro. In Recorder, select *Macro • Record,* type Hang up, press <Tab>H, and select *Start.* In Terminal, press <Esc><Alt>FXN. In Recorder, save the macro. In Recorder, save the macro file as DIAL.REC. Now, whenever DIAL.REC is open, you can highlight a number in a *Windows* app and press <Ctrl>-D to dial it. When your party's phone rings, pick up your phone and press <Ctrl>-H.

Shane Rau, assistant technical editor

Print Screen Problem

Q I have to press <Print Screen> three times before my HP LaserJet prints. Then it prints two-and-a-half screens, and I have to take it off line to clear it. Is there some way to make <Print Screen> print on the first press?
Gerard L. Caron, Lynn, Massachusetts

A When you press <Print Screen>, it dumps what's on the screen to your LaserJet's memory. However, since the screen dump is only 25 lines long, and the Print Screen ROM routine doesn't send an "eject page" command, the LaserJet assumes there's more text on the way. When you press <Print Screen> again, the LaserJet still doesn't have a full page in memory, so it still doesn't print. When you press <Print Screen> the third time, the LaserJet prints out what will fit on one page, leaving part of the third screen in memory to be printed on the next page.

To avoid this problem, you can press <Print Screen> once, then eject the page manually: Press the On Line button to take the printer off line, press the Form Feed button to eject the page, and press the On Line button again to put the printer back on line.

Another solution is the shareware utility *LJVGA.* This utility eliminates fiddling with the printer's buttons; you just press <Print Screen> once, and the LaserJet prints whatever is on screen. *LJVGA* can even produce super-VGA graphics at 300-dpi resolution (DOS's GRAPHICS utility prints 150 dpi) and works with DOS programs running under *Windows.* You can download *LJVGA* from PC World Online or order it by phone from the distributor.

- **LJVGA** $24 ($14 registration only); Ares Technologies; 800/242-4775, 713/524-6394, 713/524-6398 (fax)
  Reader service no. 620

Which On-line Service?

Q I am considering joining an on-line service but am confused about the options. You refer to America Online throughout the magazine, but you sometimes mention CompuServe as well. I also have a trial membership in Prodigy. Which service will give me the best access to *PC World?*
Martin P. Feinberg, Pittsford, New York

A Currently, your broadest access to the magazine is through the PC World Online area of America Online. There, you can ask questions of Here's How columnists, report subscription problems, and submit your comments to the *Letters* column. Though you can often download the shareware and freeware files mentioned in *PC World* articles from other on-line services or local BBS's, the easiest place to find the files is in each issue's Featured in folder on PC World Online. One other on-line service with a major *PC World* presence is MCI Mail, where most editors have personal E-mail accounts.

XCOPY from A: to A:?

Q My new 486 eame with a single 3½-inch floppy drive. Because many of my clients still use 5¼-inch disks, I installed a 5¼-inch B: drive. The new

drive works great, but I can no longer XCOPY directly from one 3½-inch floppy to another. Is there some way I can get that capability back?
Elizabeth Edwards, Brattleboro, Vermont

A DOS's DRIVER.SYS lets you assign multiple drive letters to floppy drives. Add the line **DEVICE=C:\DOS\DRIVER.SYS /D:0 /F:7** to your CONFIG.SYS and reboot.

The /D:0 switch indicates drive A:, and /F:7 tells DOS it's a 1.44MB drive. (If you have a 2.88MB drive, use /F:9 instead.) DOS will assign the drive both A: and the next available drive letter—if you have only two floppies and a C: drive, your phantom 3½-inch floppy will be drive D:.

If you have more than one hard drive, have partitioned your drive into multiple logical volumes, or have installed CD ROM or other drives that use their own CONFIG.SYS drivers, watch the display when DRIVER.SYS is loaded to see which additional drive letter it assigns to the floppy drive. (The message is 'Loaded External Disk Driver for Drive *x*'.)

Now XCOPY A:\ D:\ will work the way XCOPY A:\ B:\ did before you installed the second floppy drive. If you'd like to have the same capability with the 5¼-inch drive, also add the line DEVICE=C:\DOS\DRIVER.SYS /D:1 /F:1 to CONFIG.SYS. The /D:1 indicates drive B:, and /F:1 tells DOS it's a 1.2MB drive. Assuming the first floppy's double was D:, this one's will be E:.

Overlapping Commands

Q After I log into my lab's network, I can no longer access DOS's on-line help display—entering HELP brings up NetWare's interactive help system instead. How do I get DOS help while running NetWare?
S. Chandrasekaran, via Internet

A If you need to get help on a specific command, you can always use the /? switch. For example, typing UNDELETE /? displays help for the UNDELETE command.

More generally, when you have two or more commands with the same name in various directories, you can specify the one you want by typing its complete path. For example, if your DOS directory is C:\DOS, enter C:\DOS\HELP and you'll get the familiar list of DOS commands rather than NetWare's on-line help.

You can also use batch files to provide unique names for commands with conflicting names. For example, if you put the command @C:\DOS\HELP %1 in a text file and save it as C:\DOS\DOSHELP.BAT, you'll be able to invoke DOS's HELP command using the command DOSHELP.

Easing Network RAM-Cram

Q I currently run DOS 5.0 with *Windows 3.1*, and my system is connected to a NetWare LAN and a minicomputer simultaneously. Even though I put everything I can into upper memory, by the time I load all the drivers I need, I have only 430K of memory left—not enough to load some of my apps. Is there a way to load some drivers into extended or high memory?
Glenn Gardner, via Internet

A Unfortunately, your drivers have to be loaded in conventional (base) or upper memory (UMA). One possible exception is NetWare's EMSNETX.EXE driver, a NETX.EXE replacement that loads most of its code in expanded memory (EMS). However, if you don't need EMS for other purposes, switching to EMSNETX will be a net loss, because configuring DOS to emulate expanded memory on a 386 or 486 uses 64K of upper memory, the same memory EMM386.EXE uses to load drivers high.

If you don't use EMS, add the parameter **NOEMS** to the end of the CONFIG.SYS entry for EMM386 (and remove the parameter RAM, if it's there), and you'll have 64K more upper memory for drivers and TSRs.

USER GROUP OF THE MONTH

Greater Cleveland PC Users Group

The June user group tips come from the Greater Cleveland PC Users Group, which meets on the first Saturday morning of the month. The club includes special interest groups for beginners, women, and users of spreadsheets, word processors, databases, *Windows*, and OS/2.

The club's BBS has over 30 phone lines and gives members access to 6GB of files and 3000 conferences. Its shareware library, which includes a videotape library and a book exchange, is available at the monthly meeting. GCPCUG publishes a monthly newsletter with tips and tricks, reviews, and a complete calendar of computing events in northeast Ohio. For more information about the Greater Cleveland PC Users Group, contact Dan Hanson at 3150 Payne Ave., Cleveland, OH 44114, or call 216/781-4132. Yearly membership is $25.

Reader service no. 621

A NOTEBOOK FOR EVERY PRINTER: The point of having a notebook is taking it from place to place, but it's unlikely that the printers at your home, office, and client site are compatible.

You'll save some formatting headaches if you keep several printer drivers, both for *Windows* and your DOS applications, installed on your notebook. You'll obviously want drivers for your office and home printers, but drivers for PostScript, a PCL printer such as the HP LaserJet Series II, and a dot matrix printer such as the Epson FX-80 will also come in handy if you'll be printing from a variety of locations.

Dan Hanson
Greater Cleveland PC Users Group

Novell's XMSNETX.EXE, which loads itself into the high memory area (HMA, the first 64K of extended memory), won't do you any good. You'll save more base memory by loading DOS into the HMA instead, if you add the line **DOS=HIGH,UMB** to your CONFIG .SYS file.

You may be able to load more drivers high (into upper memory blocks) by configuring EMM386 to provide more upper memory. To see if that's possible, exit *Windows*, enter **MSD** at the DOS prompt, and select *Memory*. Take a look at **FIGURE 1**. The "before" display on the left side is MSD's display of my UMA when CONFIG.SYS contains the line 'DEVICE=C:\WINDOWS\EMM386-.EXE RAM 128'.

Since MSD indicated the 64K range E000-EFFF was 'possibly available', I modified my EMM386 line to DEVICE=C:\WINDOWS\EMM386.EXE /NOHI RAM 128 I=E000-EFFF and rebooted. (By default, EMM386 uses addresses from segment C800 to DFFF only; you must use the I= parameter to make EMM386 use other addresses.) As you can see in the "after" display on Figure 1's right side, that change gave me another 64K of usable upper memory. Note that although MSD doesn't display it, you can often make another 32K of upper memory available by adding I=B000-B7FF as well. However, some super-VGA boards (like my Orchid ProDesigner IIs) use part or all of that range, so check your video board manual before making the change.

/NOHI forces EMM386 to load itself entirely into conventional memory, freeing the 4K identified as 'RAM' in the "before" display and making room for a 16K program where only 12K would have fit before. This has no practical benefit in my system, but in your situation it might let you load one more driver high. And don't forget, if you don't need EMS, replacing the parameter RAM with NOEMS will turn all blocks marked 'EMS Page Frame' into 'Free UMBs'.

If MSD still shows 'Free UMBs' after you load all your drivers and TSRs, try experimenting with loading them in different orders. If after all this fiddling you still don't have enough free conventional memory to run your applications, get out your checkbook and buy a copy of *386Max* or *QEMM-386*. These third-party memory managers use various software tricks to grab more upper memory and squeeze more stuff into it than DOS can.

- **386Max** $99.95; Qualitas, Inc.; 800/733-1377, 301/907-6700, 301/907-0905 (fax)
  Reader service no. 622
- **QEMM-386** $99.95; Quarterdeck Office Systems Inc.; 800/354-3222, 310/392-9851, 310/399-3802 (fax)
  Reader service no. 623

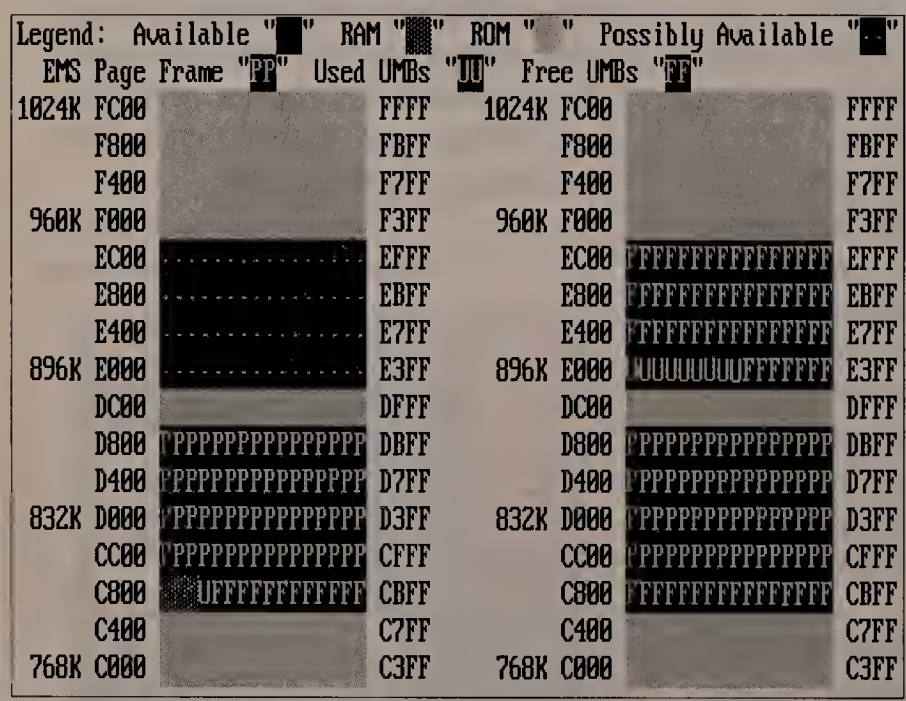


FIGURE 1: MODIFYING YOUR CONFIG.SYS'S EMM386 command can make more upper memory available for use by DEVICEHIGH and LOADHIGH. This "before" (left) and "after" (right) composite of two MSD upper memory displays shows the effect of adding the parameters /NOHI and I=E000-EFFF.

XMS = Extended?

Q When I run the DOS command MEM, it says I have 7340032 bytes of extended memory but zero bytes of *available* extended memory. Instead of available extended memory, MEM says I've 4972544 bytes of available *XMS* memory. What's the difference?

Chris Pauling, via fax

A The display of DOS 5.0's MEM command is a bit confusing. 'Total contiguous extended memory' shows how much extended memory DOS detects in your system—usually the total amount of physical RAM, minus 1MB. (In some systems, DOS may not recognize memory beyond 16MB, and the total can also be affected by RAM shadowing and other system-specific memory features.) 'Available contiguous extended memory' shows how much of that extended memory is available to programs that are written to manipulate it directly using DOS's interrupt 15h interface.

When DOS's extended memory manager, HIMEM.SYS, is activated (via the line DEVICE=HIMEM.SYS in your CONFIG.SYS file), it takes over all extended memory, so the amount of 'available contiguous extended memory' drops to zero. That memory is still available to your programs—the only difference is that they have to request it from HIMEM.SYS instead of directly from DOS.

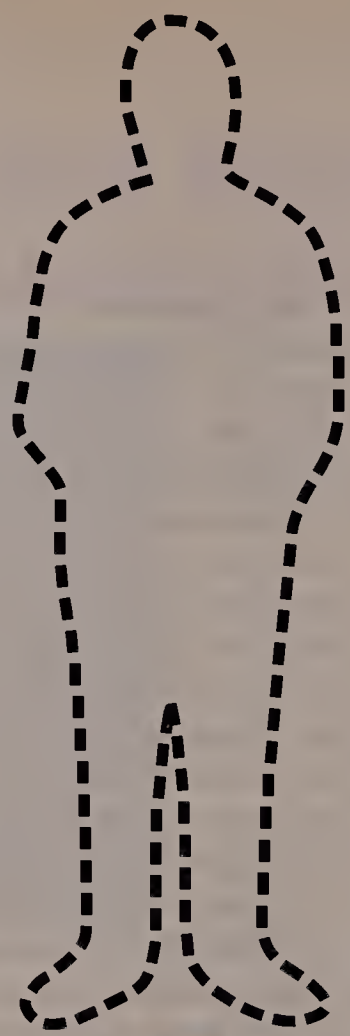
MEM's 'available XMS memory' display shows how much of the extended memory HIMEM is managing remains available for use by other programs. These days, most programs access extended memory through XMS rather than interrupt 15h, so 'available XMS memory' is the only figure most people need to worry about.

If you upgrade to DOS 6.0, you'll leave this confusion behind. The upgrade's new MEM display is a big improvement—even though it gives you more information, it's much easier to read and understand.

By Robert Lauriston

Robert Lauriston is a freelance writer and a regular contributor to PC World.

Mail your questions to Help Line, PC World, *501 Second St. #600, San Francisco, CA 94107; or send them electronically to the Help Line forum on PC World Online; CompuServe 74055,412; MCI Mail 179-3813; Internet 1793813-@mcimail.com; or 415/442-1891 (fax).* PC World *pays $50 for published questions. Sorry, we cannot acknowledge unpublished materials.*

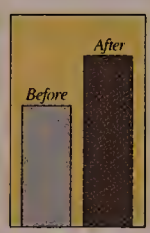


In Your Quest To Upgrade Technology, Don't Overlook The Most Important Upgrade Of All.

You've invested a bundle in personal computer hardware and software, thinking it would pay off in higher productivity. But has it?

By the end of the '80s technology boom, productivity in American business was up less than 2%. A pretty shocking figure. But not surprising when you realize most users are tapping only 10% of their computer's capabilities.

So before you pour more money into more powerful boxes and software upgrades, consider upgrading your people. Send them to ExecuTrain, the computer training leader. Independent research has shown that just one day of our instructor-led training can increase user productivity 30%. And at a fraction of the cost of your technology investment.



Studies of ExecuTrain clients show that just one day of training can improve productivity 30%.

We offer more than 150 courses, all with courseware that breaks down material into simple, easy-to-grasp concepts.

ExecuTrain training works because our instructors are first and foremost communicators, people who have a true talent and affinity for teaching. Our unique courseware presents simple concepts one at a time in plain English, not computerese. And classes are limited to about 10 students, so everyone gets the personal attention they need.

ExecuTrain instructors are experienced professionals who know how to communicate with students.

But our program doesn't end when class is over. With our unlimited free telephone support for students, an instructor is as close as the phone if a question comes up later about a subject covered in their course.

We offer more than 150 courses plus customized training on your proprietary software. And, because ExecuTrain has over 70 locations worldwide, we can tailor a program for one office or your entire organization. The best part: there's no risk. Every one of our courses comes with a money-back guarantee.

Additional ExecuTrain benefits include unlimited phone support for students and a money-back guarantee.

So how do you start getting your productivity payoff? Call today for your free People Upgrade package.

ExecuTrain®
The Computer Training Leader

1-800-535-9479

© 1993 ExecuTrain Corporation. All Rights Reserved. ExecuTrain and the ExecuTrain logo are registered trademarks of ExecuTrain Corporation.

Circle 82 on reader service card

SPREADSHEETS Q & A

Roll Over, Quattro

Q I use *Quattro Pro* to manage the inventory for my shade-tree nursery. I've set up a database worksheet where I record the year each variety of tree was planted, the size of the trees, and other facts. In a separate worksheet, I have a sizable table of database statistical functions that summarize the data by variety. Now I'm ready to roll the worksheet over to the next year, so I'd like to set up a new database sheet. The trouble is, I have more than 800 database functions that all refer to the original worksheet; if I switch the database, I have to edit each one of those formulas to make them refer to the new file. Do you know any shortcuts?
Timothy Power, Hastings, Minnesota

A The quick-and-dirty answer is, use Edit•Search & Replace. The longer but cleaner answer is, set up a what-if table, which will eliminate most of the formulas and greatly simplify the rollover procedure. Incidentally, this longer procedure will work in any spreadsheet product once you've made the appropriate command and formula modifications.

I took the liberty of reconstructing the worksheet you sent me, severely abbreviating its style (**FIGURE 1**). The database worksheet, which I've named VARIET92.WQ1, is shown on the left, with just 6 records (your original had about 240 rows). The report worksheet, VARIREPO.WQ1, is on the right.

The database statistical function formulas in cells B5..D7 calculate the subtotals by variety from the database sheet. For example, the formula in cell B5 is @DSUM([VARIET92]A3..E10,2, A1..A2). It looks in the database range A3..E10 of the file VARIET92 for the records that satisfy the criterion range in A1..A2 in the report worksheet, that is, for all records of the trees of the variety 'ACDEBORAH'. It sums the values in column number 2 of only those records of the database (that's column C in the database worksheet; column A is counted as number 0). The other summary formulas in B5..D7 all refer to the same database range, [VARIET92]A3..E10, but they vary the column number and the criterion range as necessary.

Now, let's say you've just set up your new database sheet for 1993, entered the new values for the varieties, and saved it as VARIET93.WQ1. You're ready to run the report. To change all the formulas to refer to the new worksheet, put the cell pointer in VARIREPO.WQ1 and select */Edit•Search & Replace•Block*. Highlight B5..D7 and press **<Enter>**. Select *Search String*, type **VARIET92**, and then press **<Enter>**. Select *Replace String*, type **VARIET93**, and press **<Enter>**. Note that the Look In option reads 'Formula'. Select *Next*, then *All*. In a flash, you've made all the database references refer to the new file instead of the old file.

Your database functions give you the answers you want, but it will take a really long time to recalculate more than 800 of them. And because every variety of tree needs its own criterion range, setting up and maintaining the report will be a hassle. When the number of records is as large as yours, a what-if table (like the one shown at the lower right of Figure 1 at A12..D16) is a faster way to get the answers, and it requires only one criterion range.

A what-if table (known in *1-2-3* and *Excel* as a data table) uses a small set of "seed" formulas to generate a larger table of results. In this case, the seed formulas in B13..D13 are database functions similar to those discussed previously. The one for small trees in B13 is @DSUM([VARIET92]A3..E10,2, A10..A11); those in C13 and D13 differ only in column number. The values shown in B13..D13 reflect the total number of trees of each size, because cell A11 in the criterion range is empty and thus all records are selected. To generate the table, select */Tools•What-If•1 Variable*, highlight A13..D16, press **<Enter>**, select A11 as the Input Cell, and press **<Enter>** again. Select *Quit*.

The command works like this: It takes one value at a time from the left-hand column of the table (A14..A16), enters it into the input cell (A11), recalculates the formulas in the top row of the table (B13..D13), and enters the result into the corresponding row of the table. Since the table does not consist of formulas, you must refresh the table by pressing <F8>. When you add a new variety of tree, insert it into the list in A14..A16.

Finally, when you need to roll your worksheet over to the next year, you can still use Edit•Search & Replace, but you need to change the formulas in B13..D13.

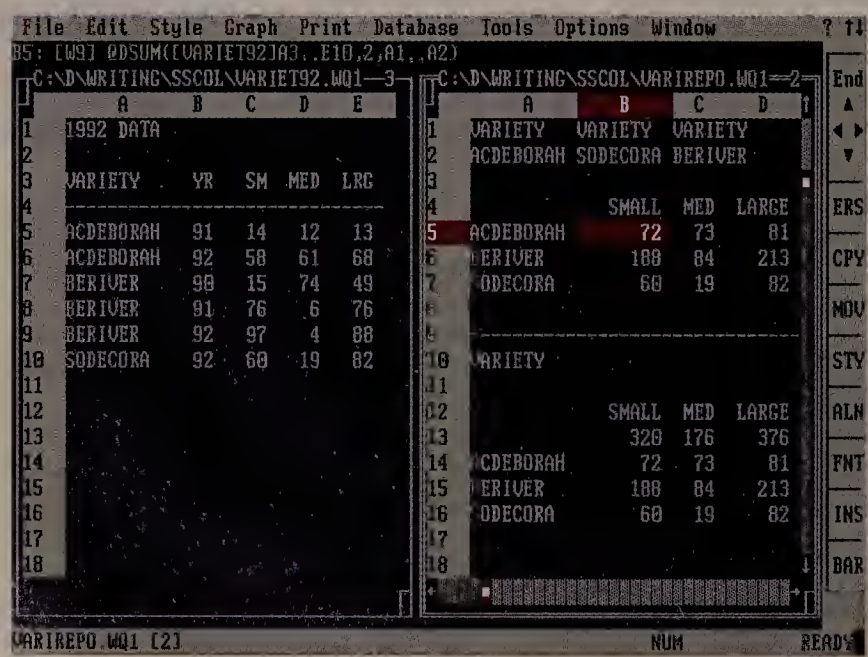


FIGURE 1: ORGANIZE A QUATTRO DATABASE by putting the data (shown at left) and reports in separate worksheets. The database statistical functions on the right summarize the database records.

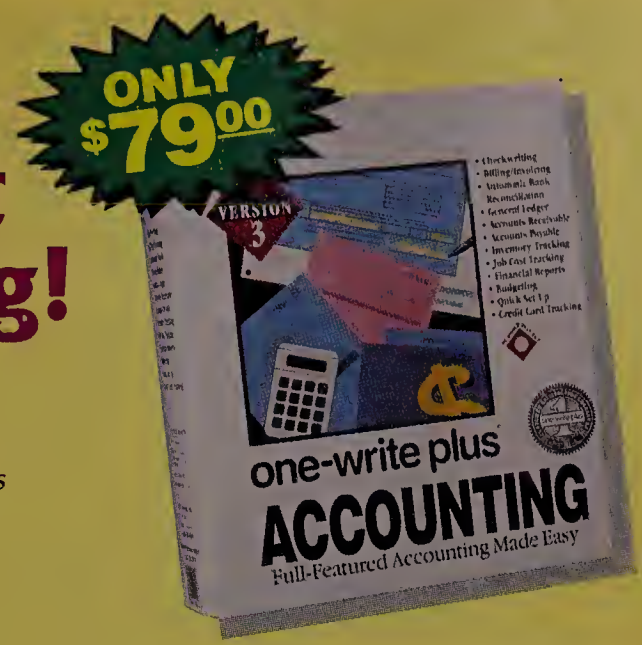
Restricting the Screen in Excel

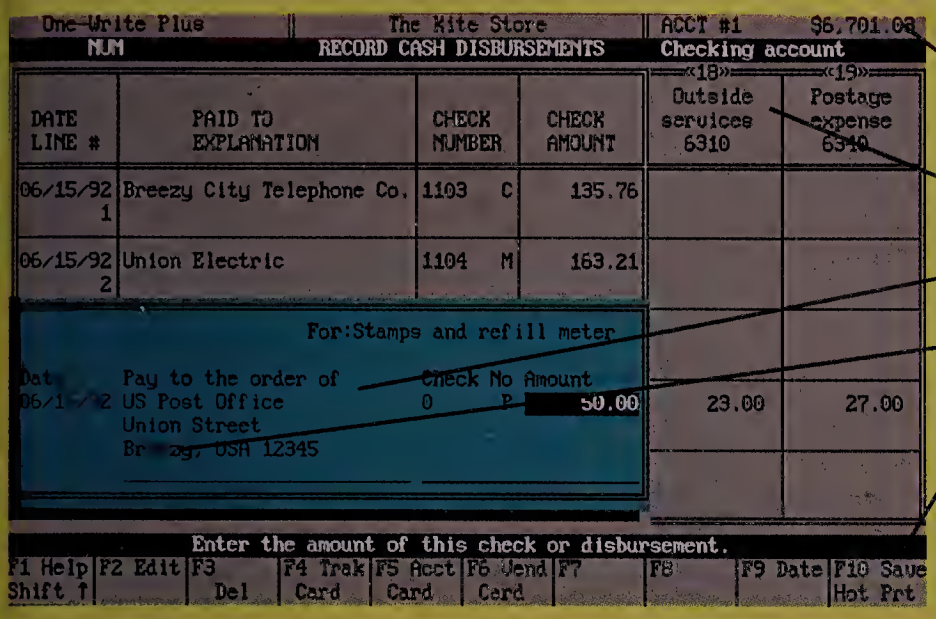
Q I've just switched from *Symphony* to *Excel*. Unfortunately, I can't seem to duplicate one of *Symphony*'s nicest features: the capability to restrict the view and cursor movements to a portion of a large worksheet (it's the command

VERSION 3.0

one-write plus®

So Easy To Use, You Won't Even Know It's Accounting!


ONLY $79.00



Calculates new bank balance after each check.

Allocate expenses to your business categories.

Prints checks ready to mail.

Fill in on-screen checks or auto input information from vendor cards.

Pop-up Chart of Accounts, Help, Vendor lists & more at touch of a key.

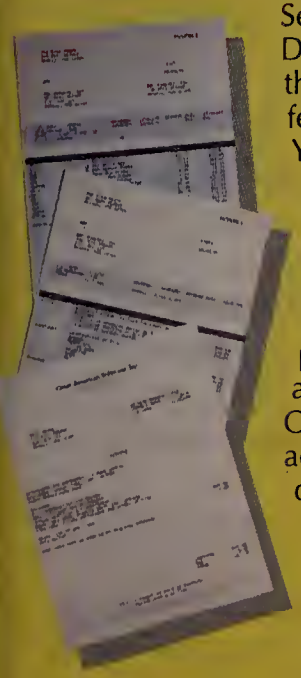
	General Ledger (GAAP)*	Audit Trail to Prevent Fraud	Tracks Your Inventory	Auto A/P Discount
One-Write Plus 3.0	Yes	Yes	Yes	Yes
QuickBooks™ 1.0	No	No	No	No

Whether you're already using a manual one-write system or not, you'll start up quicker, control your business better, do your bookkeeping faster and more accurately with new One-Write Plus Version 3.0 than with any other accounting software. You don't have to settle for a glorified personal checkbook program to account for your business.

The Fifteen-Minute Setup

Select your accounting periods and the Chart of Accounts for your business (14 built-in). Or transfer your manual one-write accounts by keying them in. Add or modify accounts any time, even while you're entering checks and receipts.

Familiar Check Writing



Select "Checks and Disbursements" from the Menu, and you'll feel right at home. You'll fill out the very same, simple one-write check you're used to, right on your PC's screen. Allocate portions of check amounts to your One-Write Plus accounts — up to 20 different accounts per check or receipt.

From here on, your PC does all the work, organizing and interpreting your financial data for you.

Choose from three invoices (Inventory, Service and Professional) to fit your business.

Your Bills Pay Themselves

Pull up the "Accounts Payable" screen. Select one bill at a time to pay, and see your checking account balance change on the screen.

Press "Enter," and neatly print out all your checks with names and addresses from your Vendor file, on most dot matrix or laser printers. Or do checks by hand, if you prefer.

Instant Reporting

In minutes you get Income Statement, Receivables Aging, Budget versus Actual, Balance Sheet, Trial Balance, whatever you need. And if things don't look just right, you can make adjusting journal entries in seconds.

Control Your Business' Destiny

New One-Write Plus Version 3.0 gives you new control over your business. Set budgets for any period up to two years, and compare any combination of actual versus budget. In amounts or percents... your choice.

You get password protection for security. Pop-up vendor and customer lists so you don't have to re-write things. And you can see which invoices are overdue, every single day.

FREE Gifts When You Buy

Buy One-Write Plus Version 3.0 Accounting for just $79 (reg. $129) now and we'll send you NEBS Mailing List Software FREE (reg. $49.95) and a $50 NEBS Forms Gift Certificate.

You owe it to yourself and your business to try real accounting software that's as easy to use as a checkbook.

For Faster Service Fax Your Order to:

1-800-777-6885

or Call:

1-800-388-8000

You must mention mail code 68147 to take advantage of this offer.

NEBS, Inc.
500 Main Street, Groton, MA 01471

All rights reserved. Not valid with any other offer.

Expires 7/31/93

**Follows Generally Accepted Accounting Principles (GAAP).*

System Requirements: IBM PC or compatible, MS-DOS or PC DOS version 3.1 or higher is required (3.3 or higher is recommended). 640K RAM and Hard Disk. IBM compatible printer required.

☐ **Yes!** Please send me One-Write Plus Version 3.0 for only $79.*, plus shipping. Bill my credit card (or check or money order enclosed), and send me my FREE NEBS Mailing List Software and $50 NEBS Forms Gift Certificate now.

Payment Method: ☐ Check or money order enclosed payable to NEBS.
Please Charge my: ☐ VISA ☐ MasterCard ☐ American Express
* (AZ, GA, MA, MO, TX, WI residents add applicable sales tax.)

Account #:_____ Exp. Date:_____

Signature:_____

Daytime Phone:_____
(If we have questions about your order)

Name:_____

Company:_____

Address:_____

City/State/Zip:_____

Media Size:
☐ 5¼" disks (Prod. #16230)
☐ 3½" disks (Prod. #16231)
(If no box checked, we'll send 5¼")

Mail to:
NEBS, Inc.
500 Main St.
Groton, MA 01471

68147-IQSPC93

Circle 222 on reader service card

<F9>•Window•Settings•Restrict•Range). How do I do this in *Excel?*
Garrett Cross, Albuquerque, New Mexico

A You can combine a couple of *Excel*'s features to make quick and elegant work of restricting the worksheet.

First, in the column immediately to the right of the range you want to show, click on the column letter to select the entire column. Hold down **<Shift>** and press **<End><Right>** to select all the columns to the right of the range. Select *Format•Column Width*, and click *Hide* in the resulting dialog box. Similarly, hide all columns to the left of the area you're not restricting. Now click the row number of the first row just below the range you want to show, hold down **<Shift>**, press **<End><Down>**, and use *Format•Row Height•Hide* to hide the row below the unrestricted area. Finally, hide any rows above it.

Cell pointer movement is now limited to the visible range, and you'll be able to use split panes within the area. To keep other users from disturbing the arrangement, select *Options•Protect Document* and enter a password.

Create a view to store the current screen arrangement so you can easily reproduce it later: Select *Window•View*, click *Add*, type a name for your new screen arrangement, for example **Restricted**, and click *OK*. When you want to apply this restricted view to the worksheet, select *Window•View*, select your named view, and click *Show*.

If you don't have a View choice under the Window menu, you need to install View Manager using your *Excel* installation disks. During the installation procedure, in the Excel Setup Options dialog box, check the Microsoft Excel check box, click on the *Excel* button, check the View Manager check box in the resulting dialog box, and click *OK*. Then click *Setup; Excel* will prompt you for the disk it needs.

Spreadsheet Toolbox

You're the training manager for a company with 500 employees, and *1-2-3* is one of the basic tools of the trade. You arrange the classroom training for the staff, but it's expensive, so placing an advanced user in an introductory class, or vice versa, is a real waste of time and money. It would be great to know about the spreadsheet skills of a prospective new hire. Isn't there an efficient way to objectively measure people's knowledge of *1-2-3?*

Yes, indeed. *The Judd Test: Lotus 1-2-3* is an almost ideal solution. When you run the test, it launches *1-2-3* on your system (a special "restricted use" edition of *1-2-3* is included, just in case you need it). A series of pop-up windows explains the test procedures and then poses a graded series of tasks. Tasks run the gamut of basic *1-2-3* operations, including simple graphs, macros, sorting, and database procedures. The examinee can use any of the resources of *1-2-3*, including the help system, to complete a task. When finished with a task, the user types an exclamation point to go on to the next. *The Judd Test* scores the test and writes the results to a file.

It's the details that make *The Judd Test* a superior product. The examiner can configure the test to include or exclude various tasks and can identify examinees by name, social security number, code number, and so on. Scoring is sophisticated—it indexes both the user's accuracy and efficiency. And reports are available at various levels of detail, right down to a record of the individual keystrokes! Created by a Stanford Ph.D., the test is based on sound psychometric principles, and the documentation is exemplary. A test for *Excel* is in the works.

I give *The Judd Test* an A!

The Judd Test: Lotus 1-2-3 $495; Mentrix Corp.; 800/767-5833

Reader service no. 606

Lost in Excel Macro Land

Q I'm an experienced spreadsheet user struggling to get started with *Excel* macros. I'm finding them to be very different from *1-2-3*'s keystroke macros. How can I go about learning the basic concepts? Once I figure out how to think about *Excel* macros, I can probably do the rest on my own.
Pam Campbell, Centralia, Illinois

A I'm going to recommend $75 worth of books, but trust me—they're worth every penny. First, get Reed Jacobson's *Excel Trade Secrets for Windows*, published by Que (ISBN 1-56529-055-0, $39.95). Carefully study the material in Chapter 2 about range names and Chapters 14 and 15 on macro concepts. Then hock your toaster oven and buy *Microsoft Excel Macros Step by Step* by Steve Wexler and Julianne Sharer (Microsoft Press, ISBN 1-55615-496-8, $34.95). Start at the beginning, skim through until it starts getting challenging, and then work your way right on through to the end.

When you're done with your reading, you'll want to take a careful look at a professionally prepared example. Crank up *Excel*, select *File•Open*, and double-click on the \LIBRARY directory underneath your *Excel* program directory in the Directories: list box. Find AUDIT.XLA, the add-in macro sheet that helps diagnose problem worksheets. (It will be there if you did a standard installation of *Excel;* if it's not, use the SETUP program to install it.) Hold down **<Shift>** and click *OK* to open the add-in as a standard macro sheet.

In AUDIT.XLA, notice the physical layout of the macro statements, dialog box tables, and menus. Note the documentation, including the names and comments columns. And pay attention to the range names. If you run the macro a few times and analyze the statements one cell at a time, you'll learn loads about how to build structured *Excel* macros using *Excel* guru Will Tompkins's EDJ methodology, which is fast becoming the industry standard.

Handy Lookups in 1-2-3?

Q I'm using *1-2-3* release 3.1 to manage my kids' soccer league teams. I'm entering everyone's birth date, and I want a way to group them by age. For example, if a kid was born between August 1, 1981, and July 31, 1982, he or she would go into the U-11 ("11 or under") group. What's the best way to do this?
Cliff Karten, Johnston, Rhode Island

A A quick way is to use a lookup table and a set of lookup functions. To set it up, start with a blank worksheet and select */Worksheet•Global•Format•*

IN THE WILD, IT'S A KILLER. IN BUSINESS, IT'S A LIFESAVER.

Dominant. Powerful. Precise. That's the formidable character of the QMS® 860 Hammerhead Printer. Its singular purpose is to provide you with sharp, clear printouts. Fast, compact and capable of remarkably accurate printing without hesitation, its mere presence in the market has caused excitement everywhere.

This desktop printer is a creature like no other — able to produce high resolution 600x600 dpi output for camera-ready originals or accurate prepress proofs. Up to 11x17/A3 output for more flexible page layout and design.

With QMS Crown™ technology, the QMS 860 Hammerhead™ operates in mixed environments of PC, Macintosh® and workstation systems with standard and optional interfaces, supporting protocols that include EtherTalk™ and NetWare® for ultimate compatibility. It can also accommodate multiple users through its compatibility with a variety of languages including PostScript™ Level 2, HP PCL® and HP-GL®. Yet, with all its impressive power, the QMS 860 Hammerhead is surprisingly affordable.

yes* It runs with NetWare

Others see it as a killer.
You'll see it as a lifesaver.
The QMS 860 Hammerhead.
The perfect printing machine.

QMS®

HAMMERHEAD
THE PERFECT PRINTING MACHINE

Get *your* business "Lifesaver." Call 800 972-6695 or 205 633-4300 for your nearest QMS dealer.

QMS, the QMS logo, and Hammerhead are trademarks or registered trademarks of QMS, Inc. PostScript is a trademark of Adobe Systems Incorporated which may be registered in certain jurisdictions. All other product and company names are trademarks or registered trademarks of their respective companies.
*Developer tested only. Novell makes no warranties with respect to this product.

Circle 184 on reader service card

	A	B	C	D	E
1	Birth Date	Team		Lookup Table	
2	08/01/82	U-10		0	Over 13
3	03/16/78	Over 13		08/01/79	U-13
4	06/25/82	U-11		08/01/80	U-12
5	08/25/83	U-9		08/01/81	U-11
6	03/28/80	U-13		08/01/82	U-10
7	03/27/80	U-13		08/01/83	U-9
8	03/26/81	U-12		08/01/84	U-8
9	11/13/84	U-8			
10		NA			

FIGURE 2: CONSTRUCT A LOOKUP TABLE IN 1-2-3 for a quick way to group individuals by age group.

Other•Automatic to allow *1-2-3* to format the birth dates properly. Enter all the dates and labels as shown in **FIGURE 2** in A1..A9, B1, and D1..D8. In B2, enter the formula **@IF(@CELL("type",A2..A2)="b","NA",@VLOOKUP(A2,D2..E8,1))**, and use */Copy* to copy it into the range B3..B10.

The heart of the formula is the function @VLOOKUP(A2,D2..E8,1). This formula takes the number from column A and looks for a match in the leftmost column of the table at D2..E8. When it finds a date equal to or less than the date in column A, it skips one column to the right and returns the label from column E. Remember that spreadsheet dates are numbers denominated in days, where day 1 is January 1, 1900, so the smaller the birth date number, the older the kid. The 0 in the table's top row (row 2) handles everyone older than the maximum age group.

The rest of the formula is decorative: @CELL("type",A2..A2)="b" is true when A2 is blank, thus causing the @IF function to display 'NA' when there's no birth date in column A (like in B10).

Constant Subtraction Is Getting Me Down

Q I would like to subtract a constant value, say 1.25, from a column of numbers in an *Excel* worksheet without having to subtract it from each number separately. How do I do this?

Steve Skahill, Dubuque, Iowa

A There's a very easy way to do this using Edit•Paste Special. Let's say your numbers are in A1:A20. Pick a cell, say, B1, and enter **1.25**. With the pointer on cell B1, select *Edit•Copy*. Select range A1:A20, select *Edit•Paste Special*, and click the Subtract radio button in the Paste Special box. Click *OK*, and you've subtracted 1.25 from each number in A1:A20.

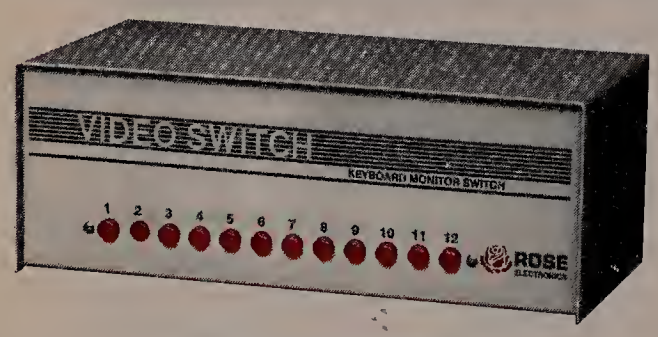
By Richard Scoville

Richard Scoville is a contributing editor for PC World *and a software training consultant based in Chapel Hill, North Carolina.*

Mail your spreadsheet questions to Spreadsheets, PC World, *501 Second St. #600, San Francisco, CA 94107; or send them electronically to the Spreadsheets forum on PC World Online; CompuServe, 72341,2727; MCI Mail 357-4517; or 415/442-1891 (fax).* PC World *pays $50 for published questions. Sorry, we cannot acknowledge unpublished materials.* ■

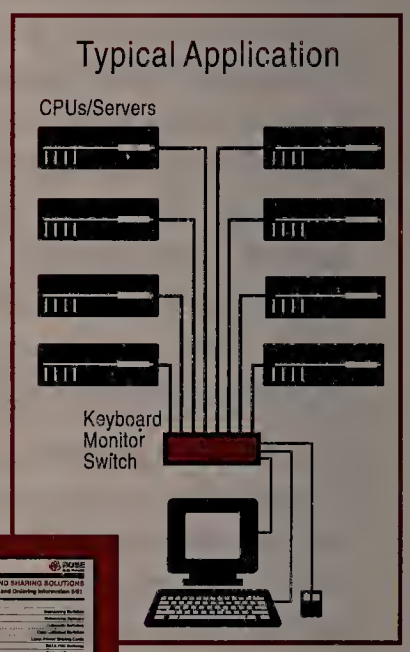
Your Choice of Keyboard Monitor Switches

Access multiple computers with a single keyboard and monitor to cut equipment costs, save valuable space, and end clutter

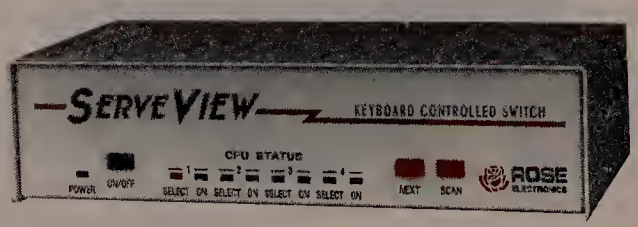


Manually controlled unit

- Simple pushbutton operation for quick selection
- Four, eight, or twelve ports per unit
- Daisy-chaining connects unlimited number of CPUs
- Compatible with EGA, VGA, Macintosh, Sun, and others
- Optional keyboard booting for 286, 386, and 486
- Optional RS232 or PS/2 mouse interface
- PCB construction for high reliability and low crosstalk
- Rack mount, matrix, and customized units available



- Switch by keystroke, from front panel, or RS232 port
- Two or four ports per unit
- Cascade units to support up to 255 CPUs
- Supports monochrome, EGA, and VGA
- Includes keyboard booting for 286, 386, and 486
- Includes RS232 and PS/2 mouse interface
- LEDs display selected CPU and CPU power-on
- Scan function switches among CPUs automatically



Keyboard controlled unit

Call toll-free now for your copy of our Switching and Sharing Solutions catalog.

Other Rose products: Print servers, printer sharing units, print buffers, keyboard monitor extenders, video splitters. All Rose products are US-made and have a 1-year warranty.

Make the Rose Connection

ROSE ELECTRONICS

10850 Wilcrest Drive • Houston, Texas 77099 • Phone (713) 933-7673 • Fax (713) 933-0044

1-800-333-9343

Circle 239 on reader service card

THE FIRST RULE OF WINDOWS IS REAL ESTATE, REAL ESTATE, REAL ESTATE.

The 20", 1280 X 1024, Non-Interlaced SAMPO AlphaScan LC Color Display Now Available At The Competition's 17" Price

It's twenty inches of high res, high powered Windows performance that lets you make the most of your display real estate. How does SAMPO do it? It's easy when you're already building corporate grade displays for some of the world's largest workstation manufacturers.

The New SAMPO AlphaScan LC is 100% VESA compliant, and compatible with virtually all Super VGA graphic controllers and autosyncs up to 1280 x 1024, non-interlaced resolution. Rich color saturation, sharp text and graphics, ergonomic control features, and big screen real estate, make the SAMPO AlphaScan LC ideal for Windows, as well as CAD and publishing.

If you demand the most from your display systems and your budget; just compare our product to their product, our specs to their specs, or, if that isn't convenient, compare the image in our ad to the image in theirs. The difference is obvious.

Finally, compare their price to our fiercely competitive SAMPO price. You'll choose SAMPO.

To make the SAMPO choice at a dealer near you, please contact one of our fine distributors listed below.

SAMPO
A M E R I C A

The Best Monitors You ~~Never~~ Ever Heard Of

(404) 449-6220 FAX: (404) 447-1109

NEW ENG.	NEW YORK	MID-ATLANTIC	SOUTH	MID-WEST		WEST COAST	CANADA
Hi-Link 800-683-9535	Micro Central 800-836-4276	Distribution Plus 800-998-0316	Crescent Computers 800-852-6294	MicroUnited 800-755-8800	PC Wholesale 800-525-4727	Colfax 415-968-3806	Merisel 800-268-1220
Action Data Dist. 508-359-4848		AW Industries 800-638-0520	Sesame Systems 800-876-6789	Mid States Technologies 800-876-2242		CDI 800-321-9932	

Circle 255 on reader service card

WORD PROCESSING Q & A

WordPerfect 5.1 Base Font Switchers

Q I often need to change the base font in *WordPerfect 5.1*, but it's a pain to press <Ctrl>-<F8>F and scroll through the list of fonts each time I do it. Is there an easier way?
Steven Kayser, Wantag, New York

A Making your base font changes is a perfect job for a set of easy-to-record <Alt>-*key* macros. Start *WordPerfect* with a blank screen. Press **<Ctrl>-<F8>F** and make a note of the fonts you want to make available in your macros, then press **<F1>** to return to the editing screen. Follow the steps below for each font you want to assign to a macro.

1. Press **<Ctrl>-<F10>** to start the macro recorder.
2. Hold down **<Alt>** and type an easy-to-remember key for a particular font. For example, try **<Alt>-T** for Times Roman. Type a description for the macro, then press **<Enter>**.
3. Press **<Ctrl>-<F8>F**, then use the cursor keys to select the base font you want assigned to the macro. Press **S** to select the new base font, then type in the point size and press **<Enter>**.
4. Press **<Ctrl>-<F10>** to complete the recording.

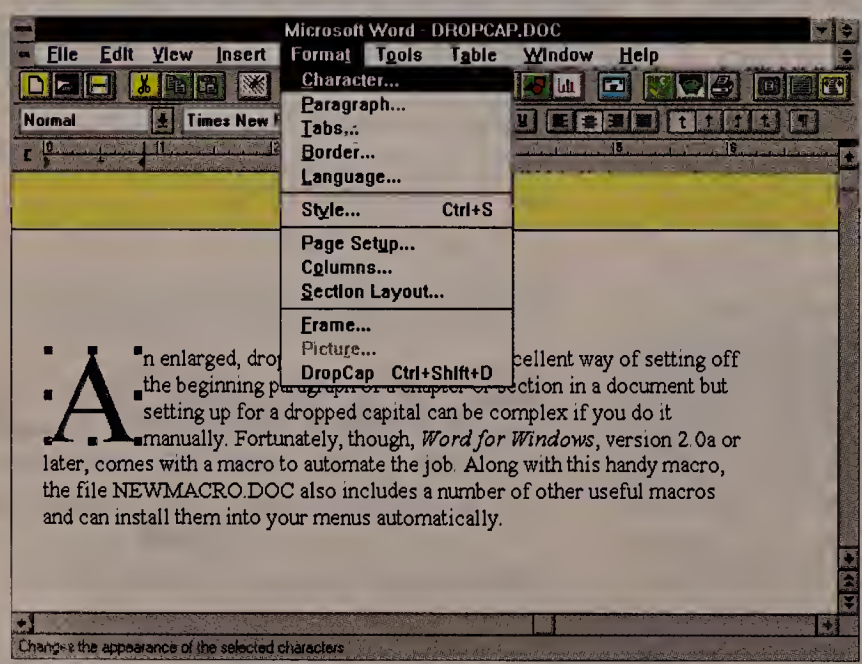
Repeat this process for each font you'll use frequently, giving each a different hot key. Whenever you're using *WordPerfect 5.1*, you can switch base fonts by pressing the <Alt>-*key* combination you've assigned to your favorites.

Disk Full Error in WordPerfect for Windows

Q When I was working on a large *WordPerfect 5.1 for Windows* document containing a lot of graphics, I got a 'Disk Full' error when I tried to save. I was surprised because my hard disk has over 18MB of free space. I found a directory, WP}WP{TD.1, on my disk that contained two files, WP}WP{.GF1 and WP}WP{.GF2, which totaled almost 18MB in size. I couldn't find any reference to these files in the manual and lost all my edits. What's going on?
Nick Williams, Walnut Creek, California

A When you import a graphic image into a *WordPerfect for Windows* document, *WordPerfect* converts it into a format it can use and then stores the image in a temporary file. The more graphics, the bigger the file. That file stays in place as long as the document is open and is deleted when you close it or exit *WordPerfect for Windows*. As you discovered, in a long, graphics-laden document, the temporary files can get unmanageably huge, especially if you're using scanned TIFF color images. And you can't save your document because the disk is full. It's a catch-22.

The solution is to break your document into smaller segments and work on each part separately. When you have finished editing, you can close one section and work on another. Temporary files won't become so monstrous, and you'll be able to save your document. If you *must* work on the entire document at once, you'll have to free up enough hard disk space to accommodate the temporary files.



CREATE A DROPPED CAPITAL LETTER in Word for Windows with the DropCap macro found in the NEWMACRO.DOC file.

From WordPerfect to Ami Pro

Q I recently switched from *WordPerfect 5.1* for DOS to *Ami Pro 3.0*. Is there a way I can convert my old *WordPerfect* documents into the new *Ami Pro* format for editing?
Ketan Patel, Roselle Park, New Jersey

A Easily. When you import your old *WordPerfect* documents into *Ami Professional 3.0*, you'll retain almost all the formatting, including tables and multiple columns from the old documents. You may have to change some fonts manually, however. Here's the process:

After starting *Ami Pro*, select *File•Open*. In the List files of type list box, choose *WordPerfect 5.0 & 5.1*. Next, select the appropriate drive and path to find your existing *WordPerfect* documents; choose the file you want to open in the Files list box, and click *OK*. Now select *OK* in the Import Options dialog box (the default *Convert Styles* option works best in most cases).

Once the import is complete, you'll see the document on the *Ami Pro* screen. If your *Windows* environment doesn't include the same fonts as your old *WordPerfect* printer drivers, you may have to alter the document's fonts. Make any other changes and select *File•Save*. Type in a new file name, then select *OK* to save the file in *Ami Pro* format.

Ami Pro will automatically store the new file in its normal document directory. If you need to convert more files, repeat the process. *Ami Pro* will remember the directory where your *WordPerfect* documents are stored.

Dropped Caps in WinWord

Q I need to create dropped capital letters in *Word for Windows 2.0*. I've tried doing it simply by changing the font size for the first character of a paragraph, but the character extends above the paragraph. That's not the effect I want. Is there an easier way to do this?
Sunny Singh, Queens, New York

INTRODUCINGTHEULTIMATEUTILITYFORCOMPRESSEDDATARECOVERY.

Soyou'reworkingwithcompresseddata,huh? You need the Norton Utilities 7.0.

NEW FEATURES

- *Complete DOS 6.0 Support*
- *Automatic Compressed Data Recovery*
- *Advanced Recovery Mode for Physically Damaged Disks*
- *Large Hard Drive Support up to 2 Gigabytes*
- *Optimization of Compressed Data*
- *Hardware Diagnostics*

This new version of the world's best-selling utility not only supports your regular files, but also offers total protection for DOS 6.0 DoubleSpace, Stacker, SuperStor, and SuperStor Pro files. No other single product gives you such complete compressed data support.

With Norton Utilities 7.0, compressed data users can take full advantage of the features Norton is famous for.

Like Speed Disk, which defragments your files for faster disk access and improved data recovery. And the Norton Disk Doctor, which identifies potential problems inside your system, and then automatically eliminates them. Only Disk Doctor has automated repair functions–nine of them in all–designed especially for compressed data problems.

Norton Utilities 7.0 also comes with the new Norton Diagnostics. It analyzes and tests all vital system components, including memory, communication ports, and system boards. This helps prevent data loss due to sudden system lock-ups. And gray hairs due to data loss.

From Peter Norton, the leader in data recovery software.

What's more, our Disk Editor is now armed with something we call Advanced Recovery Mode. For the first time, you can actually recover data from physically damaged disks. (Perfect for times when they mysteriously find their way into your coffee cup.)

To pick up Norton Utilities 7.0, take advantage of the upgrade offer below.

Yourcompresseddatawillthankyou.

Now current customers can pick up the Norton Utilities 7.0 for up to $130 off the suggested retail price. Here's all you do:

To Upgrade from Norton Utilities: Send us the original first page from any version of a Norton Utilities manual* and Norton Utilities 7.0 is yours for only $49** -you save $130.

To Upgrade from PC Tools (any version): Send us the original first page of your manual* and we'll send you Norton Utilities 7.0 for only $99**-you save $80.
Disk size ☐ 5¼ HD ☐ 3½ HD

For faxed information call 1-800-554-4403.* To order directly call 1-800-453-1062 (code AA27) or fax your order to 303-727-4611. Or enclose this card and your payment in an envelope addressed to: Symantec Fulfillment Center; Attn: Norton Utilities Offer AA27; P.O. Box 22335, Denver CO 80222-9509
☐ Check ☐ M.C. ☐ Visa ☐ Amex

CARD NUMBER EXP.

SIGNATURE PHONE

NAME COMPANY

ADDRESS

CITY STATE ZIP

*No photocopies please. Limited to one copy for each proof of ownership.
**Plus $8.50 shipping and handling and applicable sales tax for AZ, CA, CO, CT, DC, FL, GA, IA, IL, IN, MA, MI, MD, MN, MO, NJ, NY, OH, PA, TX, VA, WA, WI. Include applicable local tax for AZ, CA, CO, GA, NY, MN, OH, TX, VA, WA, WI. Offer good in U.S. only.
Please attach order form with payment. Allow 2 weeks for processing your order. No P.O. Boxes or C.O.D.s accepted.

THE NORTON UTILITIES®
SYMANTEC.™

*Choose option 1, select document 475. Valid in the U.S. and Canada only. For more information in Europe, call 31-71-353111. In Australia, call 612-879-6577. In Canada, call 1-800-465-2266. Everywhere else outside U.S., call 408-252-3570. Other names are trademarks of their respective holders. Actual retail price may vary. ©1993 Symantec Corporation. If you are tax exempt, please include exemption certificate or letter providing number. Resellers are not eligible.

Circle 252 on reader service card

A *Word for Windows* versions 2.0a and later come with a file, NEWMACRO.DOC, which you should find in your main *WinWord* directory. It contains a macro that automates this task. To install the macro, first select *File•Open*, choose NEWMACRO.DOC, and click *OK*. You'll see a list of available macros. Choose *DropCap*, then click on *Install*. In the next dialog box, choose a Template (NORMAL is the default), choose the Menu to hold the new entry (*Format* is ideal), enter a shortcut key if you wish, then select *OK*. You'll again see the previous dialog box; select *Cancel*, then select *File•Close* to unload the NEWMACRO.DOC file. To make your new menu entry permanent, select *File•Save All*.

Any time you want a dropped capital letter at the beginning of an existing paragraph, position the cursor anywhere in that paragraph and select *Format•DropCap*, the new menu command. If you're not already in Layout View mode, *WinWord* will automatically switch to that mode, then place the first character in a frame in a larger size. Once the dropped capital is in place, you can modify the font size of the character or resize the frame using normal *WinWord* commands. To return to the Normal editing mode, select *View•Normal*.

A Printer this good needs to be shared!

LASERNET® ShareCard™ for the HP LaserJet 4

With the LaserNet® **ShareCard** from Western Telematic, your office or work group can now economically share the power and performance of the new HP LaserJet 4 printer!

Complete:
Plug-N-Go **ShareCard** comes with 7 or 10 user card, 1 Meg of memory, cables and custom utility software.

Easy:
Simply plug **ShareCard** into MIO slot of the printer and connect the supplied cables. Configure from the front panel or use the supplied utility software.

Fast:
High speed simultaneous input on all ports.

Flexible:
Works with PCs, Servers, Macs and minis.

Economical:
7 User Model—LJF-7 (6 serial, 1 pl) — $595
10 User Model—LJF-10 (10 serial) — $695

Also works with:
- LaserJet IIISi
- PaintJet XL300
- DesignJet 300 & 600
- **ShareCards** for HP II, IID, III, IIID also available

Call or FAX today for more information on **ShareCard** or our many other LaserNet Printer Sharing Products.

1-800-854-7226
714/586-9950 • Fax: 714-583-9514

western™ telematic inc.
5 Sterling, Irvine, CA 92718

INGRAM MICRO

©Copyright 1993 Western Telematic, Inc. All trademarks are the property of their respective companies.

Circle 250 on reader service card

A New Start for Word 5.0

Q Is there a way I can force *Microsoft Word 5.0* to automatically show me a list of documents at start-up?
Harold Ennor, King City, Oregon

A *Word 5.0* will automatically run a macro with the name AUTOEXEC every time it starts. If you want to customize this macro, start *Word*, then complete the following steps:

1. Press **<Shift>-<F3>** to start macro recording.
2. Press **<Ctrl>-<F7>** to display a list of files.
3. Press **<Shift>-<F3>** to finish recording, then type **AUTOEXEC** and press **<Enter>**.
4. Press **<Esc>TGS** to save the macro and make it permanent.

Now, each time you start *Word 5.0*, you'll see a list of DOC files in the current document directory.

POWERTIP no. 285

Protecting WordPerfect Merges

If you have multiple-line fields in a *WordPerfect* secondary (data) file, blocks of information in your merged documents may end up split between pages. To avoid this, block-protect the merge codes in your primary document: In the primary file, place your cursor at the beginning of the merge codes and press either <F12> or <Alt>-<F4> (Block). Move your cursor to the end of the merge codes and press <Shift>-<F8>. Press Y at the Protect Block prompt. When you merge your primary and secondary files, your merged data will be block-protected.

Marilyn G. Butler
Gadsden, Alabama

At just 11.5 x 9.5 x 2" and 5.5 lbs., the PanelBook is the smallest LCD panel ever, yet still has all the features.

Introducing the PanelBook™ 550 from In Focus Systems.® An LCD panel should fill the room. Not your briefcase. That's why we developed the new PanelBook.

It's the smallest and most convenient LCD projection panel ever. Up to 40% smaller than most panels.

The next-generation active-matrix LCD panel. Keep the features. Lose the weight. With the new PanelBook, you don't give up anything. It's fully featured with integrated data and video.

Inside, you'll find a drawer that expands the panel to full size. It also makes a handy place to store the wireless remote.

Another innovation from the leader in LCD technology. In Focus Systems offers a complete family of LCD projection solutions for all your needs. From low-cost black & white and color, to high-resolution workstations and fully integrated projection systems. We also offer the LiteShow II™, our exclusive presentation-management system. Our new PanelBook just happens to be one of our biggest breakthroughs. Or would that be the smallest?

ANNOUNCING A VERY SMALL BREAKTHROUGH IN LCD PROJECTION TECHNOLOGY.

So it projects from simple presentations to full-blown multimedia. In 1.4 million colors at 640 x 480 resolution.

For world travelers, the PanelBook supports NTSC, PAL and SECAM video standards and has a universal power supply.

As easy to use as it is to carry. Setup is a snap. Just plug it into most any PC or Mac, and place it on an overhead. That's all there is to it.

The secret is in the drawer. How'd we make it so small? We started with a 9.4" LCD and an innovative design for the future. Unique optics project the PanelBook's image to about the same size as much larger LCDs.

FOR MORE INFORMATION & A FREE PRESENTER'S IDEA GUIDE, CALL 1-800-327-7231.

InFocus®
S Y S T E M S

©1993 In Focus Systems, Inc. 7770 SW Mohawk Street, Tualatin, Oregon 97062. Phone (503) 692-4968. Fax (503) 692-4476. In Europe: Planetenweg 91, 2132 HL, Hoofddorp, The Netherlands. Phone 31 (0) 2503 23200. Fax 31 (0) 2503 24388. In Focus Systems is a registered trademark and PanelBook and LiteShow II are trademarks of In Focus Systems, Inc. All other products are trademarks of their respective holders.

Circle 132 on reader service card

Merritt
COMPUTER PRODUCTS

Introducing The First Truly Intelligent Labeling System!

Someone finally figured out the perfect labeling system...

No more messy labels...no more scratched-out words, or curled and torn labels to stick in your disk drive. Now there's LABELIT™.

LABELIT™ consists of a set of peel-off adhesive label-holders made of transparent plastic and a series of individual label inserts, available in five colors. Once the label-holder is permanently affixed to your disk, all you have to do is write the necessary information on the label of your choice and slip it into the label-holder. It's simple and convenient.

Not too big, not too small... LABELIT™ fits all floppy disks just right. And LABELIT™ is also available for Mini and Maxi Data Cartridges, and VHS video cassettes.

Safety assured...LABELIT™ absolutely will not come off in your disk drive...it's even been lab tested and used by the world's largest computer companies.

LABELIT™ proves that in a very complicated world, there is still room for a very simple idea.

LABELIT™
INTERCHANGEABLE LABELS

Can't find LABELIT™? Call 1-800-627-7752

Dealer inquiries invited.

BIZMART Computers • Software • Office Products
COMPUSA THE COMPUTER SUPERSTORE
MICRO CENTER
COMPUTER City SUPERCENTER
WHOLE EARTH ACCESS
Fry's ELECTRONICS
ComputerLand EXPRESS
COMPUTERS etc. SUPERSTORE

Merritt Computer Products, Inc. • 5565 Red Bird Center Dr. Suite 150 • Dallas, Texas 75237 • (214) 339-0753 or FAX (214) 339-1313

©1992, Merritt Computer Products, Inc.

Circle 217 on reader service card

PC WORLD WORLD CLASS 1993

$50,000 World Class Contest

Now you've gone too far!

Turn back to page 95 right now for a chance to win your share of $50,000 worth of top-rated hardware and software products.

Fill out and mail the PC World 1993 World Class Award ballot today!

Guaranteed prizes for hundreds of early-bird entries!

Changing WinWord Directories

Q I like *Word for Windows*, but wish it didn't automatically store all my documents in the default *Word for Windows* directory. I prefer to store my documents in a separate directory, and would like *WinWord* to use that directory for its default. Is there a way to do this?

Tony Gelphman, Sacramento, California

A You bet, as long as you have version 2.0b or later. Start *WinWord* and select *Tools•Options*. Scroll the Category window until you see the WIN.INI icon and select it. In the Startup Options list, select the item that reads 'DOC-path='. In the Setting field, change the current path to your document directory, select *Set*, then select *Close*. From then on, when you run *WinWord*, it'll know where to find your documents.

If you're still using an earlier version of *WinWord*, you can change the default directory in Program Manager. Click once on the *WinWord* icon, then select *File•Properties*, and change the drive and path in the Working Directory box. There's one caveat with this approach; *WinWord* may occasionally miss some of its own files. A better solution is to call Microsoft and ask for an upgrade.

By George Campbell

George Campbell is a contributing editor for PC World.

Mail your word processing questions to Word Processing, PC World, *501 Second St. #600, San Francisco, CA 94107; or send them electronically to the Word Processing forum on PC World Online; CompuServe, 71571,222; MCI Mail, GCAMPBELL; or 415/442-1891 (fax).* PC World *pays $50 for published questions. Sorry, we can't acknowledge unpublished materials.*

POWERTIP no. 286

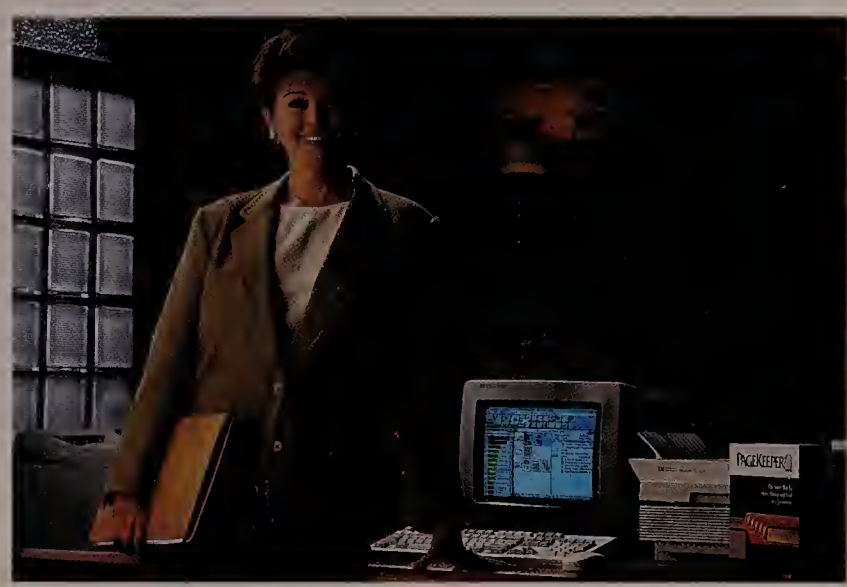
Unattached Excel

In *Excel 3.0* and higher, two cells don't have to be next to each other to be part of a selected range. If you hold down <Ctrl> while you click on cells, you will select the cells you click on but not those in between.

Yaron Shapira
Bethesda, Maryland

Once I started managing my information with PageKeeper, I realized I could get back to being a manager.

My staff hardly knew who I was anymore. I was so buried in data I never thought I'd see any of them again. Then our MIS guy suggested PAGEKEEPER.™ The results were fantastic. The first thing I did was let PAGEKEEPER index the files on my hard drive – so I rediscovered all kinds of stuff I thought I'd lost.



Then I started scanning in the piles of paper on my desk. PAGEKEEPER's built-in OCR automatically reads any document and stores it *intelligently.* But the scanned image is still there – charts, graphs, scribbles, even coffee stains. Giving me access to all my information. But for me, retrieval is where this product really shines. I've never been able to find information so fast – or so easily. I simply type in a few words I think the document contains and PAGEKEEPER does the rest. Caere's new Weighted Relevance Retrieval™ technology means the documents I'm most interested in are right at the top of the list. And when I've found what I want, PAGEKEEPER's built-in e-mail lets me easily share information with my whole team.

That's my PAGEKEEPER story. The one that let me get back to my job. To get your copy of PAGEKEEPER, see your local Caere dealer or call Caere for more information: **1-800-535-SCAN.**

caere™

For Your Information.

Caere is a registered trademark of Caere Corporation. The Caere logo, PageKeeper, and Weighted Relevance Retrieval are trademarks of Caere Corporation.
© 1993. All rights reserved.

Circle 17 on reader service card

WINDOWS Q & A

Enter the Drag-and-Drop

Q On my PC at work, I can drag a file from File Manager onto a minimized *Word for Windows* icon to open the file. This doesn't seem to work on my home PC. I'm running *Windows 3.1* on both machines. What's wrong?
Marianne Marchant, Laie, Hawaii

A *Windows 3.1* enables the wonders of drag-and-drop, but only for applications that employ this technology. *Word for Windows 2.0* and *2.0a* don't have this feature, but versions *2.0b* and *2.0c* both do. If you're a licensed user, you can get the upgrade free by calling Microsoft's *Word for Windows* technical support at 206/462-9673.

Once you've upgraded, by the way, you can also open files by dragging them from File Manager and dropping them on *Word for Windows'* title bar or on the blank *WinWord* background (visible only if no documents are open or if you've cascaded or otherwise arranged document windows accordingly).

Making File Manager Mind

Q I routinely use Recorder to construct macros within *Windows'* File Manager. Unfortunately, I keep tripping over the same problem when I try to navigate to files within a macro. Depending on whether the current selection highlight is on a disk drive, in the directory window, or in the file list, Recorder behaves differently. Can you suggest a command or keystroke that will always put the selection highlight in the same place?
Rick Cattell, Los Altos, California

A Sure thing. When you start your recording, simply press **<Ctrl>** plus the drive letter of your choice to move the selection to the drive icon. For example, press **<Ctrl>-C** to switch to drive C:, **<Ctrl>-D** for drive D:, and so on. From that point, **<Tab>** to the tree or file list in order to finish your macro.

Clearing Off the Norton Desktop

Q My new 50-MHz 486 computer came with *Windows 3.1*, DOS 5.0, and *Norton Desktop 2.0 for Windows* installed. I don't have any need for *Norton Desktop*. How can I remove this program from my computer and be certain that I have removed all of its files and changes to my system?
Marion F. Smith, San Diego

A The solution to your problem is really very simple. Just locate and double-click the Norton Desktop Uninstall icon. If for some reason you aren't able to find the icon, choose *File•Run* in *Norton Desktop*, Program Manager, or File Manager. Then type **c:\ndw\install /u** (substituting a different drive letter or path if necessary), and click *OK*. Follow the on-screen prompts to remove all traces of *Norton Desktop*.

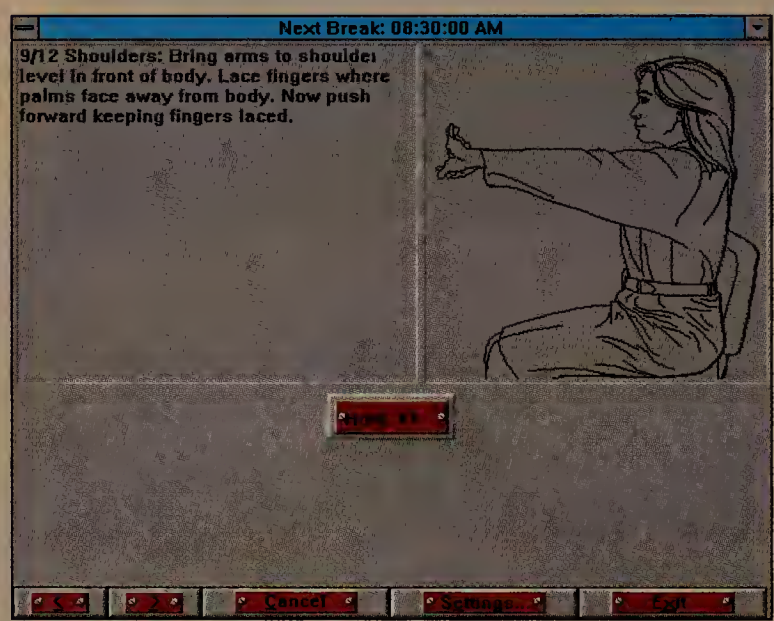
Managing PostScript Font Downloading

Q I recently installed several PostScript fonts via *Adobe Type Manager 2.5*'s control panel. When I print on my HP LaserJet III using a Pacific Page PE PostScript Cartridge, all the new fonts default to Courier. When I remove the cartridge and use the PCL language, I change the printer driver, and all the *ATM* fonts print fine. How can I get all my fonts to print correctly with my PostScript cartridge?
May Johnson, New Orleans

A When you installed the fonts, you apparently unchecked the 'Install as autodownload fonts for the PostScript driver' check box. Checking this box when installing fonts adds information to your WIN.INI file that tells your computer to download each font to your PostScript printer for each page that requires it. After the page is printed, the font is cleared from the printer's RAM. This process is known as automatic downloading. Because you did not check this option, your fonts will not print in your printer's PostScript mode until they are manually downloaded—a process that requires a special utility to send the fonts to the printer's memory.

To switch your fonts to automatic downloading, launch the *ATM* Control Panel, and in the Installed ATM Fonts list box, select the fonts that are giving

Windows Toolbox



A computer program that prompts you to exercise might sound like a joke, but muscle strains—and resultant repetitive strain injuries such as carpal tunnel syndrome—are no laughing matter. The icon for *Stress Free 1.1* sits quietly on your desktop for a user-specified interval and then pops up to guide you through an exercise routine featuring written instructions, animated pictures, and a timer that steps you through each exercise. You can choose up to ten sets of exercises, including Relaxation, Quick full body, Circulation, and routines for specific muscle groups. *Stress Free* is shareware with a registration fee of $39.95. It's available in PC World Online's Featured in June folder (STRESS11.ZIP) and on other on-line services, or from LifeTime Software, P.O. Box 87522, Houston, TX 77287-7522; 800/947-2178, 713/474-2076 (fax). Reader service no. 639

Great News! QEMM Solves DOS 6 Memory Problems!

Safety in Numbers

Safe Memory Management Keeps Your System Running Smoothly.

What's more annoying than losing work on your PC? A crash or 'hang' destroys everything you've done since the last time you saved. That work is lost forever.

Two major causes of crashes are memory conflicts and running out of memory. To avoid these problems, many users sacrifice productivity-enhancing TSRs or useful network utilities. And that's unfortunate, because the right memory management lets you have it all—safety and performance.

Have Your Cake and Eat it, Too.

QEMM-386™ version 6 lets you run your favorite programs *and* TSRs without fear of 'out of memory' problems or conflicts. It provides the maximum memory right where your programs need it.

The more memory you have, the more reliability you get. No other memory manager measures up to QEMM's performance.

PC Week Ratings	All Charge 386 3.2	Netroom 2.10	QMAPS 2.0	386Max/ BlueMax 6.00	QEMM 6.01 Analyst's Choice	Memory Commander 2.1
Software Compatibility	Satisfactory	Good	Needs Improvement	Satisfactory	Good	Satisfactory
Hardware Compatibility	Satisfactory	Good	Satisfactory	Satisfactory	Good	Satisfactory
Reliability	Needs Improvement	Satisfactory	Needs Improvement	Satisfactory	Good	Needs Improvement
Ease of Use	Satisfactory	Good	Satisfactory	Good	Good	Satisfactory
Memory Management Flexibility	Satisfactory	Good	Satisfactory	Good	Good	Satisfactory
Quality of Documentation	Satisfactory	Satisfactory	Satisfactory	Good	Satisfactory	Satisfactory

Good — Satisfactory — Needs Improvement

PC Week carefully compared them all and rated QEMM-386 v6 the best memory manager.

This is what QEMM-386 does for a typical PC. It reorganizes memory to produce greater speed and safety.

Nobody Knows Memory Like We Know Memory.

That's not bragging, just fact. As recently as two years ago, DOS ignored the importance of maximizing conventional memory. At that time, our QEMM-386 v5 provided up to 128K more usable memory. QEMM became a virtual necessity for 'power users.'

Today, our latest QEMM-386 version 6 surpasses even that achievement. Thanks to our new, smart 'stealth' technology, it finds as much as 96K more high memory than other memory managers. And speaking of other memory managers, not one has yet been able to match our performance. Instead, some have slashed prices or started nasty rumors just because they couldn't reliably deliver the same results. These tactics must not work, since we outsell all the others put together.

QEMM. The Memory Manager Millions Rely on Every Day.

Considering its unsurpassed performance and the safety it adds to your system, it's no wonder that millions of PC owners use QEMM. And it should be no surprise that 'gurus' and MIS managers consistently vote QEMM-386 the top memory manager in poll after poll, year after year.

QEMM has won more recognition than all other memory managers combined.

Protect Your Productivity; Keep Your Work Safe.

Any task, from programming to writing the company business plan to composing a personal letter, takes time and thought. Your PC is supposed to make that process easier; your output better. When you can't run your favorite grammar-checking TSR or have to get by without a vital network utility, you're sacrificing productivity.

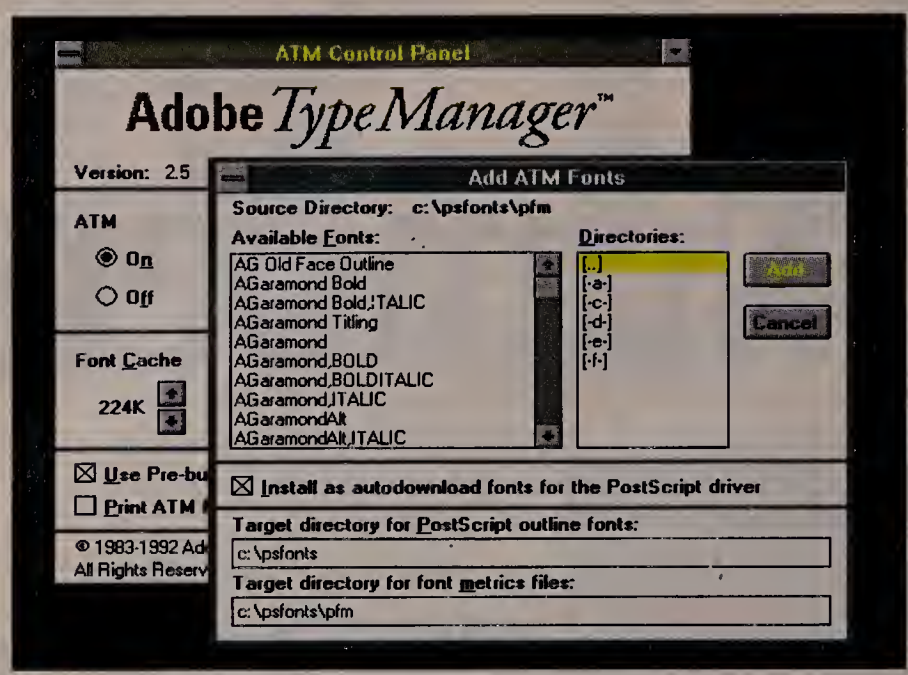
QEMM comes with Manifest, the award-winning memory analyzer that helps you avoid memory conflicts.

Whether you're running MS-DOS, IBM™ PC-DOS, DR DOS or MS Windows, don't sacrifice; don't compromise; don't risk losing work. QEMM-386 version 6 is the most powerful, flexible memory manager you can buy. Period.

Quarterdeck Office Systems, 150 Pico Boulevard, Santa Monica, CA 90405 (310) 392-9851 Fax (310) 314-4219
Quarterdeck International Ltd., B.I.M. House, Crofton Terrace, Dun Laoghaire Co. Dublin, Ireland Tel.(353) (1) 284-1444 Fax: (353) (1) 284-4380

©1993 Quarterdeck Office Systems. Trademarks are property of their respective owners.

Circle 189 on reader service card



BY ADDING AND REMOVING A FONT with Adobe Type Manager 2.5, you can control whether a font downloads manually or automatically.

you trouble. (To select more than one font at a time, hold down the <Ctrl> key while clicking.) Then click *Remove*, and accept any prompts to remove the fonts. Don't worry; the fonts will stay on your hard disk—they're inactivated only temporarily.

Next click *Add*, and select the directory where you keep your font metrics files (usually it's \PSFONTS\PFM). When the list of fonts appears, select the ones you just removed. This time, be sure to check the box next to 'Install as autodownload fonts for the PostScript driver'. Then click *Add*. Since you're using the latest version of *ATM*, most applications won't require you to restart *Windows* for the changes to take effect (consult the README.TXT on your *ATM* disk for details).

Of course, Adobe gives you this option for a reason. Sometimes you can print faster if you download the fonts manually—if you're printing many pages that use the same fonts, for example. That's because auto-downloading flushes each font from your printer's RAM after the page is printed. Manually downloaded fonts stay in your printer's memory until you shut the printer off—handy for repeating the same font page after page.

On the negative side, manual downloading requires special downloading software and makes you download the fonts each time the printer is turned on. Moreover, if you download too many fonts, you'll use up so much of the printer's RAM that the printer won't have enough to print your pages. If you have a choice, it's best to use manual downloading for a few frequently used fonts (such as text faces) but to call on automatic downloading for seldom-used fonts (such as display faces for headlines or advertisements).

To change automatically downloaded fonts to manually downloaded fonts, simply remove the fonts in question, click *Add*, then deselect the 'Install as autodownload fonts' box and add the fonts again. Then the only thing left for you to do is manually download the fonts that you need.

Most Adobe PostScript font packages come with a pair of DOS utilities that you can use for manual downloading: PSDOWN.EXE (a menu-driven program for use with serial ports) and PCSEND.EXE (a command-line program that works with parallel ports). The latter is handy for creating font-downloading batch files that can even be run from your AUTOEXEC.BAT file. If you don't have either of these programs but you do have *Windows* software from Micrografx, you can download the fonts from the dialog box for the PostScript driver that comes with most Micrografx products.

Old Files, New Error Messages

Q When I'm working in *Windows*, I sometimes receive an error message that says, 'Call to Undefined Dynalink'. Can you tell me what's going on?

Thom Drayton,
Albuquerque, New Mexico

A This message usually signals the presence of an out-of-date DLL (dynamic link library) file in the directory in which you installed *Windows*. Likely culprits: TOOLHELP.DLL, SHELL.DLL, COMMDLG.DLL, OLECLI.DLL, and OLESVR.DLL.

The correct version of these files should be located in the WINDOWS\SYSTEM directory and should have the date 3/10/92. (If you're running *Windows for Workgroups*, the date will be 10/1/92.) Check these file dates and their locations.

If you aren't able to find the proper (updated) file on your hard drive, look on your *Windows 3.1* disk (you should expect that the extension's last character will be replaced with an underscore). To decompress one of these files to your hard drive, go to the DOS prompt, switch to your *Windows* directory, and then type **EXPAND**, the location of the original file, and the location where you want the file to end up.

For example, if you wanted to restore the TOOLHELP.DLL file from your A: drive, you would type **EXPAND A:\TOOLHELP.DL_ C:\WINDOWS\SYSTEM\TOOLHELP.DLL.**

By Scott Dunn

Scott Dunn is a contributing editor for PC World *and coauthor of* 101 Windows Tips *(Peachpit Press, Berkeley, California, 1992).*

Mail your questions to Windows, PC World, *501 Second St. #600, San Francisco, CA 94107; or send them electronically to the Windows forum on PC World Online; CompuServe, 74055,412; MCI Mail, 179-3813; or 415/442-1891 (fax).* PC World *pays $50 for published questions. Sorry, we cannot acknowledge unpublished materials.*

POWER TIP no. 287

Auto-Load Calendar File

You can program *Windows 3.1's* Calendar to load the same calendar file automatically every time you launch it. Select, but don't open, Calendar's icon in Program Manager, press <Alt>-<Enter>, type the file's name (we'll call it JEFF'S-.CAL) in the Command Line text box, and click OK.

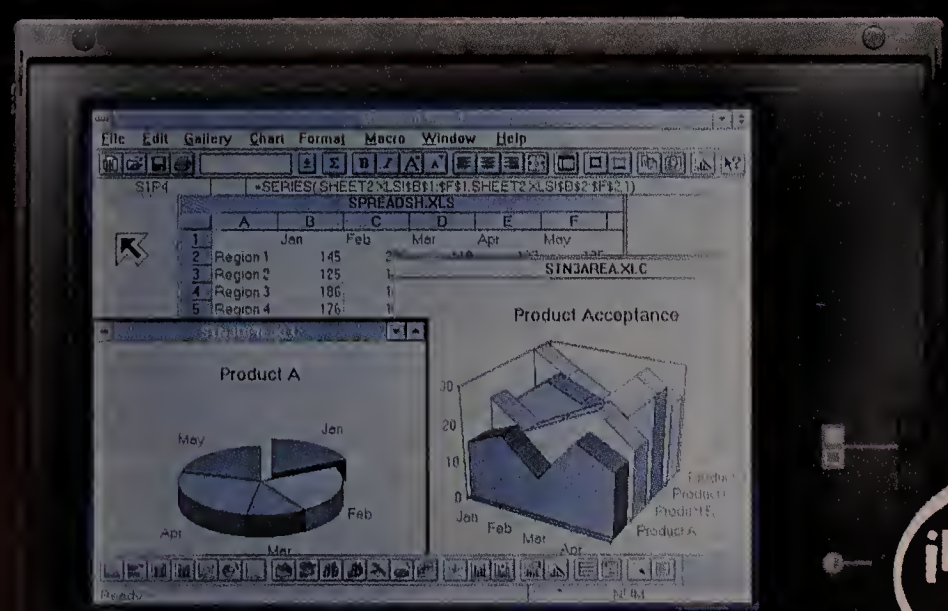
Jeff Guillet
South San Francisco, California

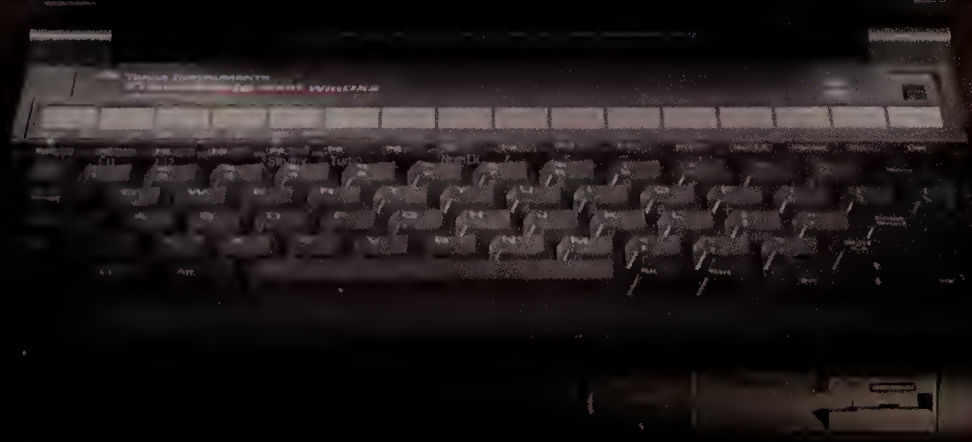
"It's a quality desktop replacement... most powerful portable we've seen. One of the lightest units in the entire test group."
– *PC Magazine, Mar. '93*

"...in our battery tests, the TI 4000 WinDX2/50 achieved a magnificent 6 hours and 24 minutes."
– *Portable Computing, Apr./May '93*

"TI has done more to customize and optimize Windows than the other notebook vendors."
– *Windows Magazine, Feb. '93*

Mar.30,'93





TravelMate, WinDX2 and "Extending Your Reach With Innovation" are trademarks of Texas Instruments.
The Intel Inside logo is a trademark of Intel Corporation. © 1993 TI.

TI TravelMate 4000
WinDX2/50

Our Performance Is Getting Rave Reviews.

As well it should.

For starters, the TravelMate™ 4000 WinDX2™/50 notebook computer comes with a 486 DX2 50MHz processor for increased speed and performance.

It's specifically designed around built-in Windows, so it's able to power up in just 30 seconds.

And its amazingly long battery life is made possible by TI's superior power management system.

For more information about the incredible, lightweight, award-winning TravelMate 4000 notebooks, simply call *1-800-527-3500.*

TravelMate 4000	
486 WinDX2/50	***486 WinDX2/40 COLOR***
4 or 8MB RAM std.	*8MB RAM std.*
(20MB max.)	*(20MB max.)*
120 or 200MB HDD	*200MB HDD*
5.6 pounds	*6.3 pounds*

Battery life varies according to model and use.

EXTENDING YOUR REACH WITH INNOVATION™

TEXAS INSTRUMENTS

Circle 244 on reader service card

DATA MANAGEMENT Q & A

Marking dBASE Records After Printing

Q I use *dBASE III.Plus* to print catalog labels for new prospects. Each day I enter names and addresses into a data file called MAILING. This file includes a date type field called Sent, which I leave blank. About once a week, I use the REPORT command to print labels for all records with a blank Sent field, then I add a date to Sent for all the new records.

The whole process works fine, except that I hate having to go back and mark the records in the Sent field so that people don't get catalogs twice. Is there an easier way to do this?
Ann Tompkins, Chicago

A You have a good procedure set up. By running a short program like the one in **FIGURE 1** to do a mailing, you can make the process even better. You can create this program in any text editor; to use the one that comes with *dBASE*, type **MODIFY COMM** at the dot prompt. As you enter the lines, substitute the name of your report form for the word *Labels* in the third line (the second line is a comment that you can omit). Save your program as **LETTERS.PRG**. When you want to print your labels, enter **DO LETTERS** at the dot prompt.

```
USE Mailing
* Use your own report name for Labels
REPORT FORM Labels FOR ;
  Sent = CTOD("")
GO TOP
REPLACE ALL Sent WITH DATE() ;
  FOR Sent = CTOD("")
```

FIGURE 1: PRINT LABELS AND UPDATE DATA with this short dBASE III Plus program.

Saving Deleted dBASE Records

Q In the June 1992 issue, the *Data Basics* column showed how to determine which *dBASE III* or *dBASE IV* records have been marked for deletion. In my particular application, it would be useful to copy these deleted records to another file. Could you tell me how to do this?
Joe Marciniuk, Edmonton, Alberta, Canada

A You can easily save the information in *dBASE* records that are flagged for deletion, before reusing or zapping them, with the COPY command. At the dot prompt, with the file you want to copy from open, simply enter the command **COPY TO oldrecs FOR DELETED()**. *dBASE* will create a new data file named OLDRECS containing the flagged records. You don't, of course, have to name the file OLDRECS.

Since COPY creates a *new* file, you'll need another technique if you want to append "deleted" files to an existing OLDRECS file. In this situation, enter the command **COPY TO temp FOR DELETED()**. Then **USE OLDRECS** and run the command **APPEND FROM temp**.

Counting With Paradox Queries

Q Using *Paradox*, I'm trying to count the number of records in my ORDERS table for each customer, and I'm obviously doing something wrong. I do an Ask query on ORDERS, checking only the Customer # field and typing in the calculation Calc Count. But when I press <F2> to Do_It!, I get a count of 1 for each customer number, even though some customers have ordered more than once. How do I get *Paradox* to give me the right answer?
David Newman, Honolulu

A Easy. All you do is add the keyword **All** after Calc Count. This tells *Paradox* to include all records in the count for each customer. As long as you have just the Customer # checked, you should get the answer you want.

Drawing Lines in Paradox Reports

Q I'd like to include boxes around some of the data in my *Paradox 4.0* reports. Right now, I'm using dashes or the underline character to "draw" lines, but they don't look very good. Can I get real boxes with corners, intersecting lines, and so on?
Randy Dillon, Santa Clara, California

A You can put good-looking boxes in your *Paradox* reports, but it takes a little time (well, maybe a lot). First, open your PAL Reference manual to the ASCII character table in Appendix H—any ASCII table will do. Look toward the end of the chart and you'll see the box- and line-drawing characters. For example, character 179 is a single vertical line, and 196 is a single horizontal line. There are also characters for box corners, middle-of-the-line intersections, and combinations of single and double lines. Keep this chart handy while you work.

Unfortunately, your printer might not use the same extended ASCII characters as does character-based DOS (and *Paradox*). Some printers, including the HP LaserJets, offer these characters as an option, but not the default. To use this option, enter report design mode and select *Setting•Setup•Custom* and your printer port. Type the control code for changing your printer's symbol set (just add it to the end of the string if there's already one present). For a LaserJet, the code is **\027(10U**. Then enter a reset string to return to your printer's default (**\027(8U** for a LaserJet).

Now you're ready to draw your lines.

USER GROUP TIP

Memos and Memory in dBASE IV

When editing or browsing *dBASE IV* or *FoxPro*, you can discover if a Memo field contains data by looking at the word *memo*. If it's capitalized, that means there is text.
Bob Coppedge
Greater Cleveland PC Users Group

GET THE POWER

COPYING POWER. PRINTING POWER. SCANNING POWER. GET THE POWER TO PUT ON PAPER WHAT YOU CREATE ON THE SCREEN. THE POWER TO SCAN IN 24-BIT COLOR. THE POWER TO PRINT IN 24-BIT COLOR. AT 400 DPI. FOUR COLOR PROCESS WITH 256 GRADATIONS PER COLOR. IN WINDOWS™ AND MACINTOSH.®

GET THE POWER TO CREATE HIGH-QUALITY COLOR DOCUMENTS TO GET YOU THE PROMOTION. THE POWER TO WIN THE NEW PIECE OF BUSINESS. THIS IS THE FUNDAMENTAL IDEA BEHIND THE CANON CJ10 WITH OPTIONAL CONNECTIVITY. TO GIVE YOU HIGH-QUALITY COLOR COPIES. TO GIVE YOU THE POWER OF COLOR. AFFORDABLE ENOUGH FOR ANY SIZE BUSINESS. GET THE POWER. CALL 1-800-OK-CANON.

CJ10 COLOR BUBBLE-JET COPIER

Come see us at COMDEX BOOTH # 1630

Come see the Canon Greater Hartford Open Golf Tournament June 24-27, or watch it on CBS (June 26-27.)

© 1992 Canon U.S.A., Inc.

Canon is a registered trademark of Canon Inc.
Bubble-Jet,™ CJ10 logo, and color mark are trademarks of Canon Inc.
Macintosh® is a registered trademark of Apple Computer, Inc.
Windows™ is a trademark of Microsoft Corporation.

THE POWER OF COLOR IS YOURS.

Canon

Circle 50 on reader service card

For a single character, move the cursor to the place you want the line and hold down the **<Alt>** key while entering the character's number code on your keyboard's numeric keypad. When you lift <Alt>, the character will appear.

If you're creating a long line, that can get monotonous. Luckily, you can use miniscripts to automate the process. To create a single horizontal line, press **<Alt>-<F10>**, choose *Miniscript*, and enter **FOR x FROM 1 TO** *n* **TYPEIN CHR(196) ENDFOR**, where *n* is the length of the line in characters. For a single vertical line, change the miniscript to **FOR x FROM 1 TO** *n* **TYPEIN CHR(179) DOWN LEFT ENDFOR**. You'll still have to put in the corners and intersections individually.

Preferences for Access Reports

Q I don't care for many of Microsoft's formatting defaults in *Access* reports, and I'm always changing things like text size and fonts. Can you tell me how I can create my own defaults that will come up every time I start a new report?

Mark O'Connell, San Francisco

A Yes, I can tell you how. First, define the properties you want as the default in a single report. For example, to change a report's default font for fields, bring up that report in the designer, select a field, and change its font. With the field still selected, choose *Layout•Change Default*. This sets the default for that particular report.

You must assign those default properties, and any others you've changed, to all new blank reports. Choose *View•Options•Form and Report Design*. Go to the Report Template option in the Items list, type the name of the report you just changed, then press *OK*. Your new defaults will be in place.

Customizing Data Entry With Approach

Q I've been using *Approach* to create reports for my *dBASE* databases. I suspect it would be simpler to forget about *dBASE* and enter and edit the data directly in *Approach*. But I don't know how to put today's date in a field automatically. Can I do this and other database modifications easily with *Approach?*

Tom Wagner, Los Angeles

A *Approach* has a Data Entry Options dialog box that lets you control data entry. To use this feature, open your data entry form (if you open a *dBASE* file, *Approach* will create a default form) and select *View•Design*. Double-click on the field you want to customize. When the Field Style dialog is shown, click on *Field Definition* and then on *Options*. The resulting Data Entry Options dialog box will give you plenty of choices, including one to insert the creation date in a new record.

By Celeste Robinson

Celeste Robinson is the author of The Paradox 4.0 Handbook *(Bantam Computer Books, New York, 1992) and a contributing editor for* PC World.

Mail your questions to Data Management, PC World, *501 Second St. #600, San Francisco, CA 94107; or send them electronically to the Data Management forum on PC World Online; CompuServe, 74055,412; MCI Mail, 179-3813; or 415/442-1891 (fax).* PC World *pays $50 for published questions. Sorry, we cannot acknowledge unpublished materials.* ■

The Perfect Back-up For An Imperfect World.

Accidents don't happen in perfect worlds. In *this* world, the best solution is VALITEK.

VALITEK builds every tape back-up drive as though your business depends on it. There's no safer, simpler, smarter tape back-up drive anywhere. No installation. No controller cards. No pre-formatting tapes. Back-up from 60 MB to 1.2 GB with speed and reliability no bargain basement tape drive can begin to match.

Complete portability. Rock-solid construction. Uncompromising quality.

When you can't afford to lose a single bit of data, can you afford anything less than VALITEK?

VALITEK

100 University Drive, Amherst, MA 01002

CALL: 1-800-VALITEK or 413-549-2700

FAX: 413-549-2900 BBS: 413-549-7560

The worldwide leader in parallel/serial technology

Circle 224 on reader service card

CompuServe does Windows.

Introducing a whole new way to look at CompuServe: CompuServe Information Manager for Windows (WinCIM℠). It's a fully integrated Windows application, and lets you take advantage of Windows when you're on CompuServe. It'll make your session faster, more efficient, easier, and a lot more fun.

With the help of icons and pull-down menus, you'll find your CompuServe time is almost effortless. Cruise the forums, browse through your messages, download files — it's all about as simple as clicking a mouse button.

And with WinCIM you can do more offline, too. That means everything from writing letters to reading the answers to your hardware and software questions can be done much more economically.

PC World is now available on CompuServe, too, with a special introductory offer: order now, and get a free membership kit (new members only, please), including a $15 usage credit.

Just call 1 800 848-8199 and ask for the *PC World* representative. Outside the United States and Canada, call 1 614 457-0802.

CompuServe®

The information service you won't outgrow.™

Windows is a trademark of Microsoft Corporation.

Circle 33 on reader service card

PUBLISHING & PRESENTATIONS Q & A

Colorful Backgrounds in Harvard Graphics

Q I just bought a copy of *Harvard Graphics 3.0* to create charts, but I don't like the canned backgrounds. How do I create my own backgrounds?
Lynn Walterick, Bartlesville, Oklahoma

A The fastest way is to edit the chart palette, then blend two colors to create a shaded background. Load your chart, press **<F6>** to reach the main menu, and select *Setup•Color palette* to open the color palette screen. You'll see the background color in the preview box that appears in the upper-right corner. The small box on the left side of the preview box is the starting color box for shaded backgrounds, and the small box on the right side is the ending color box. The three boxes below the preview box let you pick the shading direction (side to side or top to bottom) or choose a solid background color.

To create a shaded background, follow these steps:

1. Move the cursor to the starting color box and press **<Enter>**, or if you are using a mouse, click the box; you'll see a white frame appear around it. Then move the cursor to the chart colors palette on the left side of the screen and press **<Enter>**, or click on the color you want to select it. You can also choose colors from the custom colors palette (below the chart colors palette) if you like.

2. Move the cursor back to the side-to-side or top-to-bottom box (on the upper-right part of the screen) and press **<Enter>**, or click one of them to select a direction for the shaded background.

3. Move the cursor to the ending color box and press **<Enter>**, or click the box. Then move the cursor back to one of the color palettes (on the left of the screen) and pick out the other color you want to use.

4. Finally, press **<F6>** (File) and select *Save palette* to save the chart palette using a new name and, if you like, a description. Press **<Enter>** to finish saving the file.

You'll see the new blended colors in the background preview box. To see a preview of your current chart with the new background, press **<F9>** (Edit Palette) and select *Redraw chart*, or press **<F2>** (Show chart) for a full-screen view. Now just press **<F6>-E** to exit and return to the main menu. (If you chose the full-screen view, hit **<Esc>** first to return to the color palette.)

To use the same shaded background behind every chart, follow these steps:

1. Select *Presentation•Edit Presentation* from the opening menu and load your presentation file.

2. In the Edit Presentation screen, press **<F8>** (Options) and select *Presentation appearance.*

3. Press the space bar to set 'Use presentation chart palette' to Yes and press **<Enter>**.

4. Press **<F3>** to view the list of files in *Harvard*'s Palette directory. Now, move the cursor to highlight the palette you want, and then press **<Enter>** to set the *Presentation chart palette* option.

5. Press **<F10>** twice, select *Presentation•Save presentation*, type the file name and the description (if desired), and press **<Enter> <Enter>**.

From now on, *Harvard* will apply the same color palette and background to each chart in the presentation. To view the entire presentation, press **<F2>** (Preview) from the Edit Presentation screen and press **<Enter>** to display each chart.

JAZZ UP A HARVARD GRAPHICS 3.0 PRESENTATION with your own shaded color background. You can select a side-to-side or top-to-bottom blended background using any two colors you want.

Proper Fractions in PageMaker

Q Is there a painless way to create fractions in *PageMaker*?
N. Weisel, New York

A Yes, if the only fractions you need are ¼, ½, and ¾. Most standard text fonts, such as *Windows 3.1*'s Times New Roman and Arial, provide those three common fractions as alternate (or extended) characters, which you can easily insert into your text by holding down the **<Alt>** key and typing **0188** on the numeric keypad to get ¼, **0189** to get ½, or **0190** to get ¾.

Creating other fractions takes a little more doing. Here are the steps:

1. Select the text tool and select *Type•Type specs* or press **<Ctrl>-T** to open the Type specifications dialog box. Choose the font you want and click *OK*.

2. Insert the text cursor in your document and type the fraction—for example, 5/6 or 13/15—using a slash (/) between the numerator and the denominator. Then select the entire fraction.

3. Select *Type•Type specs•Options* or press **<Ctrl>-T** and **<Alt>-O** to open the Type options dialog box.

4. Now you can adjust the position of the numerator and denominator by changing two of the Type options default settings: Type **60** for the super/subscript size and type **0** for the subscript position setting. Click *OK* twice to save the new settings and return to your fraction.

5. Select the numerator and press **<Ctrl>-<Shift>-** to make it superscript. Select the denominator and press **<Ctrl>-** to make it subscript.

The fraction is now formatted and

NEW FOR WINDOWS!

1993 BYTE READERS' CHOICE AWARD

WordPerfect for Windows 5.2
June, 1992

PC MAGAZINE EDITORS' CHOICE

Paradox for Windows 1.0
May 11, 1993

INFO WORLD 1992 PRODUCT OF THE YEAR

Quattro Pro for Windows 1.0
April 26, 1993

The steal of the century!

An unbeatable value

Introducing the Borland® Office for Windows—an unbelievable deal on the three best Windows programs, *all in one package!* If you own any Windows or DOS word processor, spreadsheet, or database, Borland and WordPerfect are working together to bring you a deal you can't miss.

WordPerfect,® the world's most popular word processor and winner of *BYTE*'s Readers' Choice Award; Quattro® Pro for Windows, the spreadsheet that just won *InfoWorld*'s Product of the Year Award; and Paradox® for Windows, the easiest-to-use relational database, and winner of *PC Magazine*'s Editors' Choice Award. If you could put together your own office of Windows software products, this would be it.

The three top products for the price of one. This is more than a deal—this is the steal of the century!

Limited-time offer.
Special upgrade price $299.95

90-day, money-back guarantee!

See your dealer or call now,
1-800-336-6464, ext. 6627
In Canada call, 1-800-461-3327.

Borland
Power made easy

Special introductory price is $299.95 for first-time buyers. Copyright © 1993 Borland International Inc. WordPerfect is a registered trademark of WordPerfect Corporation. Offer good in the United States and Canada only. All prices in U.S. dollars. Dealer prices may vary. B! 5655

the baseline of the denominator should be aligned with the baseline of normal text. If you'd like to make further adjustments, repeat step 4, using inerements as small as 1/10 of 1 percent to fine-tune the super/subscript size and subscript position.

You can also create fractions faster by using keyboard shortcuts—**<Ctrl>-<Shift>-** for superscript and **<Ctrl>-** for subscript—to format each numerator and denominator along the way *before* you type them. Follow these steps just before you type each fraction:

1. With the text tool selected, press **<Ctrl>-<Shift>-**, type the numerator, and then press **<Ctrl>-<Shift>-** again.
2. Type a forward slash for the fraction bar.
3. Press **<Ctrl>-**, type the denominator, and then press **<Ctrl>-** again.

Service Bureau Miniguide

Q I've created a presentation using *CorelDraw 3.0* and want to print the files as color transparencies, but I don't have a color printer. I've heard that there are commercial companies that can produce the color transparencies for me. Can you tell me how I can locate them and what they do?
Chris Darner,
San Juan Capistrano, California

A You're looking for a service bureau—a business center where you can rent PCs by the hour, as well as print your documents. Some shops have high-resolution imagesetting machines that can print your pages on camera-ready (specially coated) reproduction paper or film negatives, which a commercial print shop can then use for small press runs. Some of them also provide scanning and color slide-making services.

Many service bureaus accept your files on disk or via modem and produce your documents for you. Some shops even provide overnight turnaround. You can find service bureaus, photocopy shops, and instant-printing centers listed in the phone book.

To print your *CorelDraw* files as color transparencies, look for service bureaus with color PostScript laser printers, such as a Tektronix Phaser or QMS ColorScript series printer, that are capable of producing full-color transparencies. Prices can run from $5 to $15 per transparency so shop around for the best bargain. Finally, make sure the service bureau has *CorelDraw 3.0* installed so you can simply send or take in your files on disk. If you can't, you'll need to save your *Corel* files as PostScript print files (using *Corel*'s own Print to File option for color PostScript printers), then at the shop, copy them to the printer.

By Richard Jantz

Contributing Editor Richard Jantz is an electronic publishing and presentation consultant in Berkeley, California.

Mail your publishing and presentations questions to Publishing & Presentations, Q&A, PC World, *501 Second St. #600, San Francisco, CA 94107; or send them electronically to the Publishing & Presentations forum on PC World Online; MCI Mail RJANTZ; or 415/442-1891 (fax). Send make-over candidates, preferably clean and unfolded, to* Publishing & Presentations, Make-Overs, *at the above address.* PC World *pays $50 for published questions or make-overs. Sorry, we cannot acknowledge unpublished materials.* ■

COMING UP

- **Tips Galore!**

This jackpot of *Windows* and DOS tips offers 75 new ways to help you spend less time getting your system to work and more time getting your work done. Don't miss our hot new tips on DOS 6.0 commands and utilities!

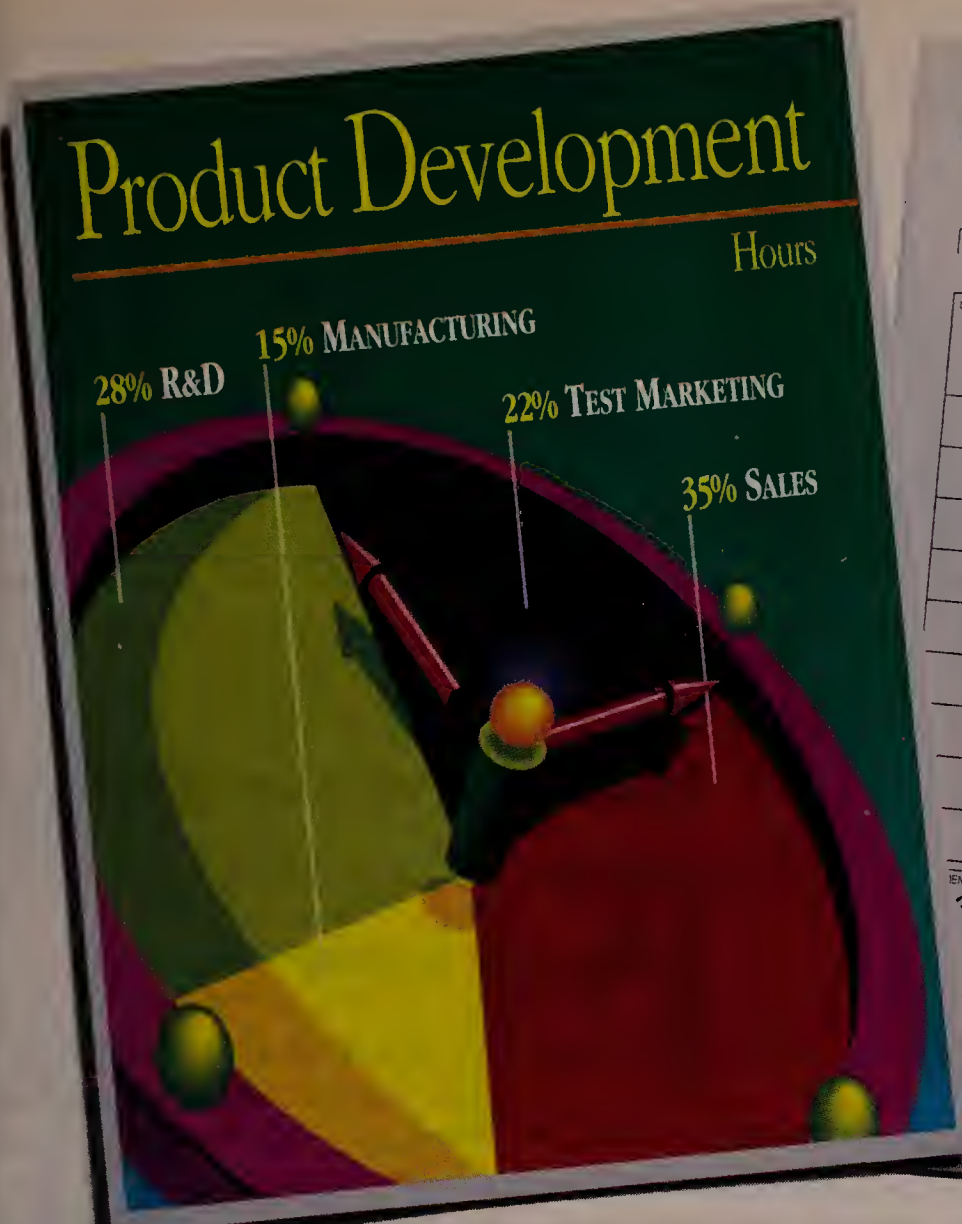
- **Can 486 Notebooks Give You Desktop Power?**

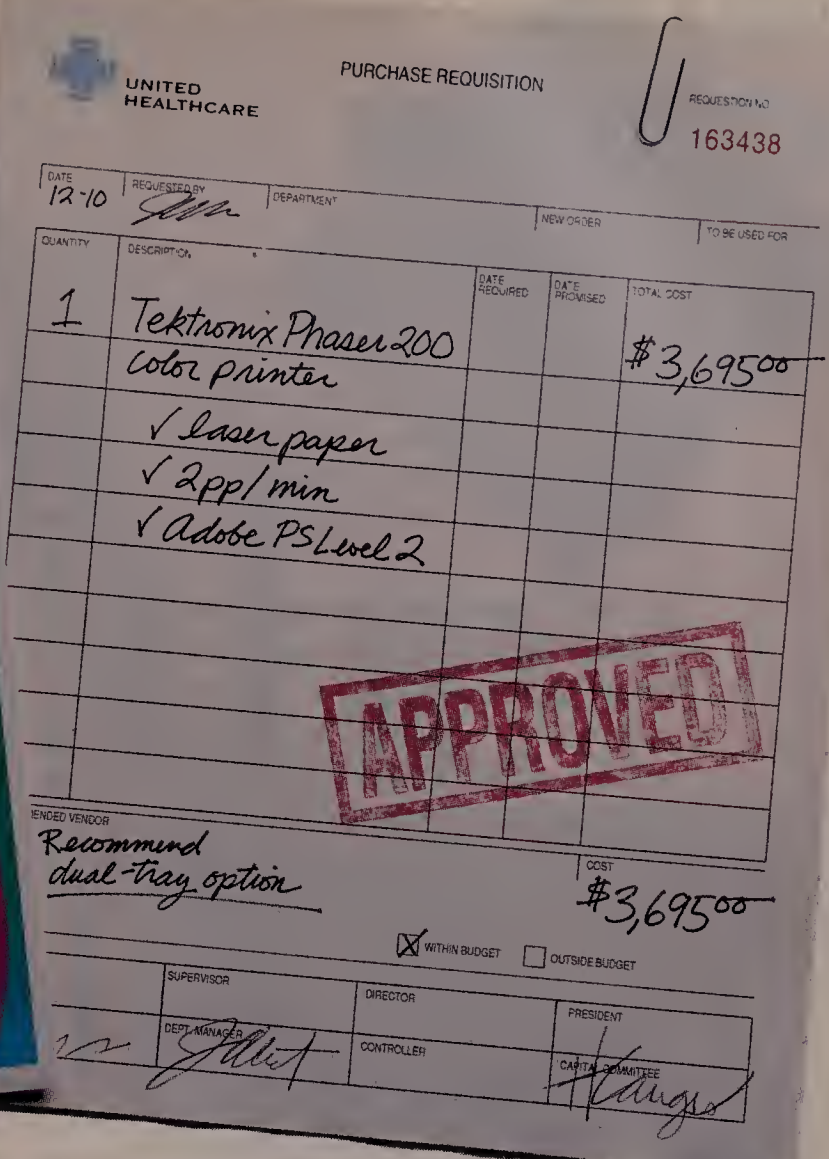
We review 16 color 486 notebooks that promise the power of a desktop and the portability you need when working away from the office. Our comprehensive usability tests reveal just how well these units travel in real-life situations.

Plus:

- **Personal Laser Printers for Under $1000**
- **13 Disk Care Utilities**
- **Tips on customizing icons in *WinWord*, buying memory upgrades, and more!**

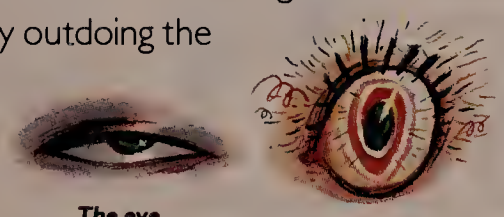
PC WORLD





Our new color printer not only looks great on paper, it looks great on paper.

True, the brilliant color produced by the new Tektronix Phaser® 200 is captivating. But the price is equally attractive. And though we've become the award-winning leader in color printers by frequently outdoing the competition, this time we've even outdone ourselves. Introducing our newest business work group color printer.



The eye when it sees black and white. ***The eye when it sees color.***

The Phaser 200 is compatible with virtually any business software and can print two colorful pages per minute. No, not two minutes per page—two pages per minute. And even at a speed like that, it still manages to print eye-catching color on common laser paper or transparencies using a separate input tray for each. You select the medium you want at your computer keyboard. And it switches automatically from user to user just as easily, using its parallel, serial, AppleTalk,™ or optional EtherTalk™ and Ethernet™ ports.

It has all the advantages of a laser printer. True Adobe PostScript™ Level 2, networkability, Pantone® colors, speed and price. (Did you notice it's only $3695, slightly below unheard of?) And when you add to that extremely high materials capacity and sparkling TekColor™ output—not just any color, but the indisputably best color in the business—you've got something even better than our previous best. Which is quite a feat.

So stop by your nearest Tektronix dealer or call us at 800/835-6100, Dept. 281 for a free output sample. For faxed information call 503/682-7450, ask for document # 1223. You won't find another business investment that looks this good on paper.

Tektronix

Phaser is a trademark of Tektronix, Inc. PostScript is a trademark of Adobe Systems, Inc. All other marks are trademarks or registered trademarks of their respective companies.

Circle 124 on reader service card

COMMUNICATIONS Q & A

Hitchhiking on the Internet

Q I use America Online, CompuServe, GEnie, and a few bulletin boards. But all the business people I deal with seem to have Internet addresses. Can you tell me how to join?
Robert Stewart, Larkspur, California

A What confuses people about Internet is, it's not an on-line service in the conventional sense. You can't subscribe to it by mailing in a card torn from a magazine. Originally a Department of Defense network, it's now a vast web linking universities, businesses, and some commercial on-line services around the globe. A true anarchy, it has no central governing body.

Internet offers a cosmos of data, software, and services. But its main advantage is, through it you can send E-mail to anyone in the world.

The easiest way to get access is to work for an Internet-linked school or business, but you can connect to it by other means. CompuServe, MCI Mail, GEnie, and America Online offer cheap E-mail links to Internet. But they don't carry the raucous Internet discussion conferences (Usenet) that are so popular. Nor do they provide access to more sophisticated features like FTP, which lets you download software and files, or Telnet, which actually lets you log on to other Internet computers.

If you want to participate in Usenet discussions, there may be a BBS in your area that carries it. Many big ones do, especially FidoNet BBS's. (FidoNet, by the way, is now linked to Internet, so you can also send and receive Internet mail via local Fido boards.) Check out the file NIXPUB.ZIP on PC World Online for a list of some BBS's that carry Usenet. Two commercial on-line services, Portal (408/973-9111, voice) and The WELL (415/332-4335, voice), also offer Usenet.

Many small commercial on-line services that provide Telnet and FTP access as well as E-mail and Usenet are springing up around the country. One is HoloNet (510/704-0160, voice; 800/638-4656, fax or modem), which offers off-peak access through local numbers in most major cities for $2 per hour. a2i Communications offers Internet access for $12 per month (408/293-9010 and 408/293-9020, both modem; type "guest" when you log on).

Performance Systems International, of Reston, Virginia, sells Internet access in a variety of packages. The company also provides users with front-end software that tames the beastly Internet interface. For $29 per month and a $19 sign-up fee, PSILink Basic service provides E-mail, Usenet, FTP, and menu-driven software to navigate Internet. PSI can also link your company's network into Internet, with all Internet functions, for $175 to $300 per month (800/827-7482, voice; 703/620-4586, fax).

Internet is a vast web linking universities, businesses, and some commercial on-line services around the globe.

There are several files floating around BBS's and on-line services that give you more information on Internet: "The Hitchhiker's Guide to Internet" (HHG.ZIP), "Zen and the Art of Internet" (ZEN.ZIP), and "The Inter-Networking Guide" (INETMA.ZIP). You can download them individually, or in a big parcel with several other applicable files as INTERNET.ZIP from the Featured in June section of PC World Online.

And there's finally a book that helps. *The Whole Internet User's Guide and Catalog*, by Ed Krol, is a superb guide to Internet services written by the guy who wrote the original *Hitchhiker's Guide to Internet*. It's $24.95 from O'Reilly & Associates (800/998-9938).

When Hanging Up Is Hard to Do

Q I'm using *Procomm Plus for Windows* with a Zoom Telephonics modem, but I can't get *Procomm* to hang up the modem when I click on the telephone icon. Can you help?!
Wayne Liquorman, Redondo Beach, California

A First, insert the modem command **&D2** into the software's initialization string (right after 'AT' at the beginning of the string), then reinitialize the modem. This command forces the modem to pay attention to the data terminal ready signal (DTR) coming from the PC and hang up when the PC turns the DTR signal off. This is true no matter what software or modem you're using.

To find the initialization string in *Procomm Plus for Windows,* select *Window•Setup* or press **<Alt>-S** to bring up the Setup window. Click on the *Connection* button (it turns red), and choose *Advanced* from the menu at the top of the window. Click on the *Modem Setup* button. The initialization string is at the top. Insert the **&D2**, click *OK* twice, and then reinitialize the modem by selecting *Communication•Initialize Modem* from the main menu or pressing **<Alt>-J**.

In addition, you should make sure that *Procomm Plus for Windows* drops the DTR signal between calls. Click on the open book icon at the top left of the screen to get to the dialing directory, then select *Dial•Options*. You'll find a check box called Drop DTR Between Calls—make sure it's checked.

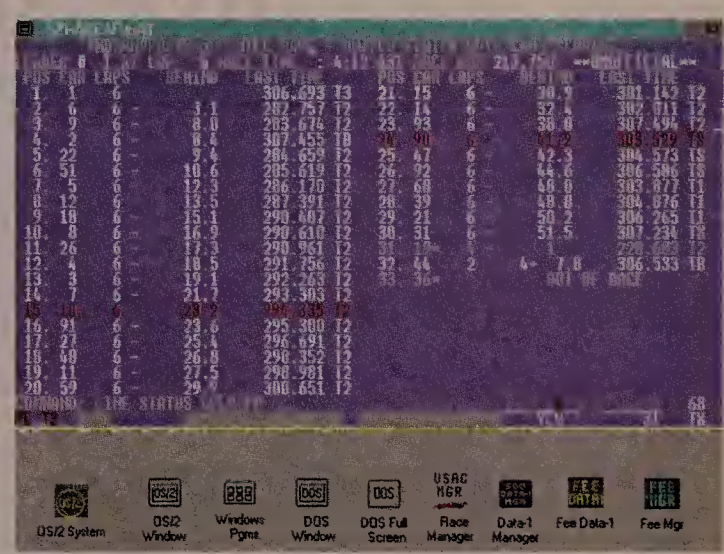
By Judy Heim

Judy Heim is a contributing editor for PC World.

Mail your communications questions to Communications Q&A, PC World, *501 Second St. #600, San Francisco, CA 94107, or send them electronically to the Communications forum on PC World Online; CompuServe, 75300,713; MCI Mail, 312-7737; GEnie, JUDY.HEIM; Internet, 3127737@mcimail.com; or 415/442-1891 (fax).* PC World *pays $50 for published questions. Sorry, we cannot acknowledge unpublished materials.*

It drives the PCs that drive the Indy 500.

When you oversee the most technologically advanced race in the world, the engine is running long before the race starts. Massive amounts of data need to be collected. Everything from entry fees, qualifying times and speeds to engine serial numbers and driver and crew information. Then all the data collected during the race needs to be compiled so the results can be validated.



At the world's most famous motor speedway, mission critical is a way of life. That's why the United States Auto Club (USAC®) and the Indy 500® have a computer system with the horsepower to get the job done. And OS/2® is the driving force behind it.

With true pre-emptive multitasking and multithreading capabilities, OS/2 helps USAC process Indy 500 data at record speeds. In fact at this year's Indy, USAC is testing an OS/2-based system that tracks cars via radio signal. In 1994, OS/2 will drive the official timing and scoring system, and determine the actual winner of the race.

Whether you measure speed in MPH or MHz, OS/2 brings the same high performance to all your DOS, Windows™ and OS/2 applications. And our soon-to-be-released Version 2.1 will be even more powerful. To find out how OS/2 can help your 386 and 486 machines run on all cylinders, call **1 800 IBM-3-OS2.***

Operate at a higher level.

*In Canada call 1-800-465-7999.

IBM and OS/2 are registered trademarks of International Business Machines Corporation. Indy 500 is a registered trademark of IMS Corp. Windows is a trademark of Microsoft Corporation. USAC is a registered trademark of the United States Auto Club. ©1993 IBM Corp.

IBM®

Circle 162 on reader service card

HARDWARE Q & A

IDE Hard Disk Upgrade

Q I plan to upgrade to a 170MB IDE hard disk. Do I need to buy a controller to go with the drive? My system already has an IDE controller built into the motherboard.
Tom Nguyen, Carbondale, Illinois

A Actually, your motherboard has an IDE *interface*, not controller. IDE drive manufacturers build all the required controlling electronics onto the drive itself, so you don't need a separate controller. You can hook up any IDE drive to any IDE interface, whether the interface resides on the motherboard or (less likely) on an expansion board. Just mount the drive in a free bay, connect it to the interface using the supplied ribbon cable, and plug in the power connector. The connectors on both the ribbon cable and the power cable can be plugged in only in one direction. As you'll read below, however, the physical connection may be the easiest part.

Third-Party Hard Disks

Q I was going to buy a replacement hard drive from the company that sold my system, but I can get a better deal at a superstore. Both the drive and the system are the standard IDE type. If I go to a third party, am I taking a risk the drive won't be compatible?
Mike Landis, Highland Park, Illinois

A Not likely, though you may have to work a little harder to get drive and system to talk to each other. Before you start, you'll need the following information about the new drive: the number of cylinders, the number of heads, the preformatted capacity, the number of sectors per track, the landing zone, and the starting cylinder for write precompensation. You don't need to know what these specs means—just crib them from the drive's documentation. If they're not there, extract the parameters from the drive vendor's technical support.

Next, run your system's setup routine. It's probably built into the system BIOS, which means that you can call it up with a key combination—usually <Ctrl>-<Alt>-<Esc>, <Ctrl>-<Alt>-S, or <Ctrl>-<Alt>-<Insert>. (You can also press <Esc> or one of the above <Ctrl>-<Alt> combinations while your system does its power-on self test). Systems that don't have setup in the BIOS come with a setup routine on a floppy disk. If you can't access the BIOS setup or find the floppy, contact your system vendor's tech support.

Look for 'Fixed Disk 1' and 'Fixed Disk 2' (or similar wordings) on the setup menu. Each will be followed by a drive type number (or 'none'). You're replacing your sole hard drive, so select *Fixed Disk 1*. A table should pop up listing around 45 alternate drive types, detailing the number of cylinders, heads, and so on. Beware! Drive type numbers are not standard, so don't try matching the type number on your drive with the type number in your system's drive table. Check your new drive's specs item by item against the ones listed for each drive type in the drive table. When you find a match, enter that drive type.

Many of today's IDE drives feature automatic translation, which enables a hard drive to keep wasted capacity to a minimum.

If you opt for a third-party drive, you probably won't find a match. Fortunately, most setup routines let you pick an unused drive type (usually Type 0, Type 47, or Type 99) and enter your drive's exact parameters. If you can't do this, select a drive type that comes closest to matching your drive's specs, provided the number of heads, cylinders, and sectors per track do not exceed those of your drive.

Unfortunately, this means wasting some of your drive's capacity. Many of today's IDE drives feature *automatic translation*, which enables a drive to keep wasted capacity to a minimum, even if the specs for the drive table entry don't match those of the drive. But watch out! Pre-1990 system BIOS's often don't support IDE drives over 100MB or even 80MB, so you could squander a huge amount of space even if the drive works properly. In such cases, get a BIOS upgrade from your system vendor before installation.

Alternatively, you can try *DrivePro* from Micro House (800/926-8299). This nifty $100 utility claims to match any IDE drive to any PC no matter what the system BIOS says. Moreover, you don't need to access your system setup software. Just install your drive, boot from a floppy, pop the *DrivePro* disk in a floppy drive, and run the program. Anyway, I tried it on two test drives, and it worked.

Finally, you'll need to run DOS's FDISK (*DrivePro* includes a similar utility that works better) and decide whether you want a huge drive C: or several smaller partitions (D:, E:, and so on; see "Tips to Organize Your Hard Disk," March). The final step is to slip a DOS system disk in drive A: and format all the partitions (enter **FORMAT C:/S** to make C: the boot drive).

Sound like too much hassle? Consider a new preloaded drive, such as Conner's 170MB Sof-Stor, which comes with its own interface board. Its interface does the configuring, so you just hook up cables. The drive comes preformatted with DOS 5.0 and includes *Windows 3.1*, *Microsoft Works for Windows*, and *Central Point Anti-Virus for Windows*. Want it even easier? Try Quantum's 240MB Hardcard EZ, a hard disk upgrade on an expansion board. Both upgrades save time, though they cost more than ordinary drives.

Clock-Doubled 486s

Q A guy in my office says you can install those Intel clock doubler chips in 486DXs as well as in 486SXs.

HURRY! RESPOND BY JUNE 30!

❑ YES! Send me the free software and trial membership to try PC WORLD Online and America Online. I understand there's no risk — if I'm not thrilled, I may cancel without further obligation.

NAME

ADDRESS

CITY STATE ZIP

( )
HOME PHONE

Disk Type* and Size:

❑ 5.25 ❑ 3.5 ❑ High Density ❑ Low Density ❑ Windows Version

* The DOS-compatible version of America Online requires 512K RAM memory, a Hercules or EGA monitor or higher, a hard drive, a mouse, and a modem. America Online is a registered service mark of America Online, Inc.

1-800-827-6364, EXT. 7252

PC WORLD ONLINE

7252/W

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 9096 VIENNA, VA

POSTAGE WILL BE PAID BY ADDRESSEE

AMERICA Online®

8619 Westwood Center Drive
Vienna, VA 22182-9806

NOW AVAILABLE FOR DOS & MICROSOFT WINDOWS!

PC WORLD ONLINE

UP CLOSE AND PERSONAL

Just one EASY call to

PC WORLD ONLINE

at 1-800-827-6364 Ext. 7252

Let's you access:

- PC WORLD Magazine's editors and experts in weekly online chats
- More than 300 Megabytes of the very latest Shareware
- Our searchable database of PC WORLD magazine's back issues
- Exclusive news & reviews
- The latest issue of PC WORLD Magazine - *"Hot off the Press"*
- *All this AND* America Online® too!

SPECIAL OFFER!

So subscribe to PC WORLD ONLINE today - we'll send you the free software you need to get - UP CLOSE AND PERSONAL!

Sign Up Now!

Win one of Media Vision's incredible new *PRO AudioStudio 16* sound cards.

16 bit Stereo sound, a microphone, and lots of new software make owning the *PRO AudioStudio* like having five cards in one:

Sound Card ■ Joystick Controller ■ MIDI Interface ■ Audio Mixer ■ SCSI Controller

Join us this month on **PC WORLD Online** for your chance to win one of 5 *PRO AudioStudio 16* sound cards.

Circle 207 on reader service card

That can't be true—those Intel "Vacancy" ads made it pretty clear that 486SXs were the ones designed to be upgradable. Otherwise, being a *Windows* user, I'd clock double my 25-MHz 486DX in a minute.
Edward Meyer, Kensington, Maryland

A I hope you didn't make a bet. Last fall Intel began selling clock doublers, officially known as OverDrive processors, as upgrades for 486DX machines. You simply pull out your old CPU, plug in the OverDrive, and enjoy a 30 to 70 percent speed increase, depending on your application.

The catch is that OverDrives for DXs won't work in every 486DX machine. Fortunately, Intel has benchmarked hundreds of DX systems to determine which can accommodate OverDrives. To get the latest list of compatible systems, contact Intel's fax-back service at 800/525-3019. If your machine is on the list, the upgrade should work. If it doesn't, Intel either will make reasonable efforts to resolve the incompatibility or will refund your money. If your machine isn't on the list and you try the upgrade, you aren't covered by the warranty.

At this writing, OverDrives aren't cheap: The 25/50-MHz version retails for $549, the 20/40 MHz model is $399, and the 33/66-MHz version lists for $699 (SX and DX OverDrives cost the same). Since you're a *Windows* user, you might get more bang for your buck with a $150 graphics accelerator card, or maybe some more memory.

The Case of the Forgetful Configuration

Q When I turned on my system recently, I got the message 'System Configuration Error—Run Setup'. I ran the setup program and the thing started properly, so I didn't think it was worth fixing (the warranty had expired). The problem recurred. Is a visit to the repair shop in my future?
Brian Connolly, San Jose, California

A Probably not. Your system keeps forgetting its configuration because its battery is dying. In most systems, a lithium battery the size of a nickel maintains a smidgen of memory containing your system configuration when the power is off. Called CMOS (complementary metal-oxide semiconductor) RAM, this memory requires a tiny amount of power to stay afloat. But when your battery begins to fail, so does the chip's recollection of your system configuration.

Usually you'll find the lithium battery in a socket on the motherboard; replacements can be found at Radio Shack or at your nearest superstore. Some systems use a cluster of standard AA batteries instead, which you'll typically find in a plastic holder stuck to the inside wall of the chassis. If you still have your system manual, it should give you the battery's exact location.

By Eric Knorr

Eric Knorr is a contributing editor for PC World.

Mail your hardware questions to Hardware, PC World, *501 Second St. #600, San Francisco, CA 94107; or send them electronically to the Hardware forum on PC World Online; MCI Mail, 459-7102; or 415/442-1891 (fax).* PC World *pays $50 for published questions. Sorry, we cannot acknowledge unpublished materials.* ■

ImagiNation™: The Happiest Place In Cyberspace.

LarryLand™
Join Leisure Suit Larry and adults from all over in the world's first Cyberspace Casino.

Post Office
Receive E-mail in your own mailbox or send mail using SierraStamps.™

The Mall
Get the best prices on all kinds of stuff!

MedievaLand™
Team up with others to explore the dark caves within an active volcano.

SierraLand™
Dogfight other Aces in Red Baron,® splat 'em in PaintBall™ or just putt around in a game of MiniGolf.

ClubHouse
A friendly place to play Bridge, Backgammon, Cribbage, Chess and other great games.

For your FREE invitation to ImagiNation, including 3 hours of on-line time, call 1-800-SIERRA-1.

There's a whole new way to have fun with your personal computer. It's called *ImagiNation: The CyberSpace Theme Park*™ and it's only on The Sierra Network.®

The Sierra Network is on-line games and more, including products for every taste and skill level. Games range from the multi-player version of the award-winning Red Baron® and the critically acclaimed fantasy game The Shadow of Yserbius,™ to more relaxing fare like Bridge and Chess. There's even multi-player games for children like Graffiti™ and Boogers.™ More than 20 great games so far ~ and more to come!

But what *really* makes The Sierra Network special is the sense of community that you get when you visit ImagiNation.™ Each night, thousands of friendly people gather there to play games, meet new friends, and generally have a good time together.

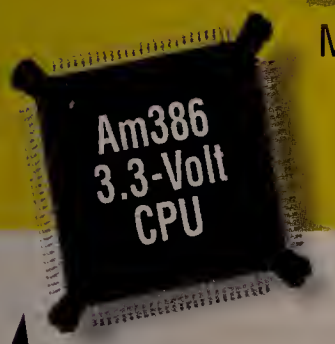
If you'd like to try The Sierra Network, all you need is a 386 or better computer, a VGA monitor, a 2400 baud modem, and a valid major credit card. Just send in the coupon, or give us a call. We'll give you everything you need to enter the land of ImagiNation, and your first 3 hours ~ FREE.*

ImagiNation on The Sierra Network. There's no place that can compare to the fun and friendship of the world's first CyberSpace Theme Park.

The Sierra Network

*Your credit card will not be charged unless you use more than 3 hours of on-line time TM designates a trademark of The Sierra Network Red Baron is a registered trademark of Dynamix Offer good until December 31, 1993 Offer available only to first time members ©1993 The Sierra Network Offer #381

Circle 191 on reader service card



More Bang Per Battery.

More documents. More spreadsheets. More presentations. Essentially, you get more work done per battery when your portable contains a 3-Volt Am386® microprocessor.

In fact, you can expect the longest battery life available, because they use far less power than other 386 CPUs.

What's more, you won't sacrifice performance for battery life. At 25MHz, you'll get all the speed you need to run Windows™ and thousands of your favorite applications.

That's why leading portable manufacturers have put 3-Volt Am386 CPUs at the heart of their next-generation portable designs.

And it's no wonder PC Magazine awarded the 3-Volt Am386 CPUs their 1992 Technical Excellence Award for paving the way in low-voltage design.

To make sure your portable makes the most of its batteries, make sure it's designed around a 3-Volt Am386 CPU.

800-222-9323

Ask for Literature Pack 15F.

Advanced Micro Devices

Microprocessors For The Masses.℠

901 Thompson Place, P.O. Box 3453, Sunnyvale, CA 94088. © 1993 Advanced Micro Devices, Inc. Microprocessors For The Masses is a service mark, and Am386 is a registered trademark of Advanced Micro Devices. All other brand or product names are trademarks or registered trademarks of their respective holders. Icons reprinted with permission from Microsoft Corporation, Borland International, Inc., Software Publishing Corporation, Aldus Corporation, Intuit, Inc., Lotus Development Corporation, DATASTORM TECHNOLOGIES, INC., Corel Systems Corporation, Berkeley Systems, Inc., WordPerfect Corporation and Symantec Corporation.

Circle 89 on reader service card

STAR-DOT-STAR TIPS

Classic Lines in WordPerfect

When I use *WordPerfect 5.1* for DOS, in addition to the number of words in a document, I often need to know the exact number of lines. Doing a word count is simple enough with the spelling checker's Count option, but I had to write a macro [**FIGURE 1**] to get a line count.

To use TOTALINE, just position the cursor where you want counting to begin, press **<Alt>-<F10>**, type **TOTALINE**, and press **<Enter>**.

John Kirkpatrick, Tulsa

Editor's note: This macro is a big time-saver. Note that it must be created using the *WordPerfect* macro editor, invoked by pressing **<Home>** followed by **<Ctrl>-<F10>**. Type **TOTALINE** (or another name for the macro if you prefer), and press **<Enter>**. You may add a description if you wish.

In the macro editor, you must insert different types of commands in different ways. To insert a command shown here in boldface, press **<Ctrl>-<Page Up>**, select the command from the pop-up list in the upper right corner of the screen, and press **<Enter>**. For commands that are boldface and underlined, press **<Ctrl>-V** and then the appropriate key (for example, **<Ctrl>-V**, then **<Down>** for {Down}). Type plainly printed text as it appears. Press **<F7>** to exit the editor. The complete macro, named TOTALINE.WPM, is available in the Featured in June folder on PC World Online.

```
{FOR}lines~1~100000~1~
   {ASSIGN}numlines~{SYSTEM}10~~
   {Down}
   {IF}{VARIABLE}numlines~=={SYSTEM}10~~
      {BREAK}
   {END IF}
{END FOR}
{PROMPT}Number of lines: {VARIABLE}lines~~
{WAIT}30~
```

FIGURE 1: COUNT THE LINES in your documents with this handy WordPerfect macro.

Duty-Free Imports

I import data into *1-2-3* from comma-delimited ASCII files—files where multiple values (fields) on one line (a record) are separated by commas. But if there's too much data on a line, *1-2-3* returns the error message 'Input line too long (240 characters max)'.

I wrote a simple Qbasic program [**FIGURE 2**] that solves this problem and takes only seconds to run. It prompts for the name of a file and allows you to choose between numeric or text input. The program reads a record's fields from the source file and then writes them sequentially to the target file, each on its own line. This allows numbers or text to be imported into a single worksheet column.

Debbie Leahy, Warrenville, Illinois

Editor's note: This program takes advantage of a quirk of Qbasic and other Microsoft BASICs: Commas in the input stream are considered to separate the stream into distinct values. You can run this program by copying it to an ASCII text file called CONVERT.BAS and typing **QBASIC /RUN CONVERT.BAS** at the DOS prompt. CONVERT.BAS is available in PC World Online's Featured in June folder.

Dialing Direct From DOS

Your modem makes a great, hands-free automatic telephone dialer, complete with a speaker that lets you monitor the progress of the call. Unfortunately, neither DOS nor most modems come with a utility for dialing from the DOS command line, a convenient place to do it. Here are two programs that will let you do just that.

The first utility, DTR.COM, controls the DTR (Data Terminal Ready) signal—which must be turned on before your modem will accept commands. If your modem is attached to COM1:, DTR's syntax is a simple DTR ON or DTR OFF. If you're using another communications port, you must give the port address immediately after the program name, as in DTR COM2: OFF, for example.

After you've used DTR to turn on your modem, you can send a command

USER GROUP TIP

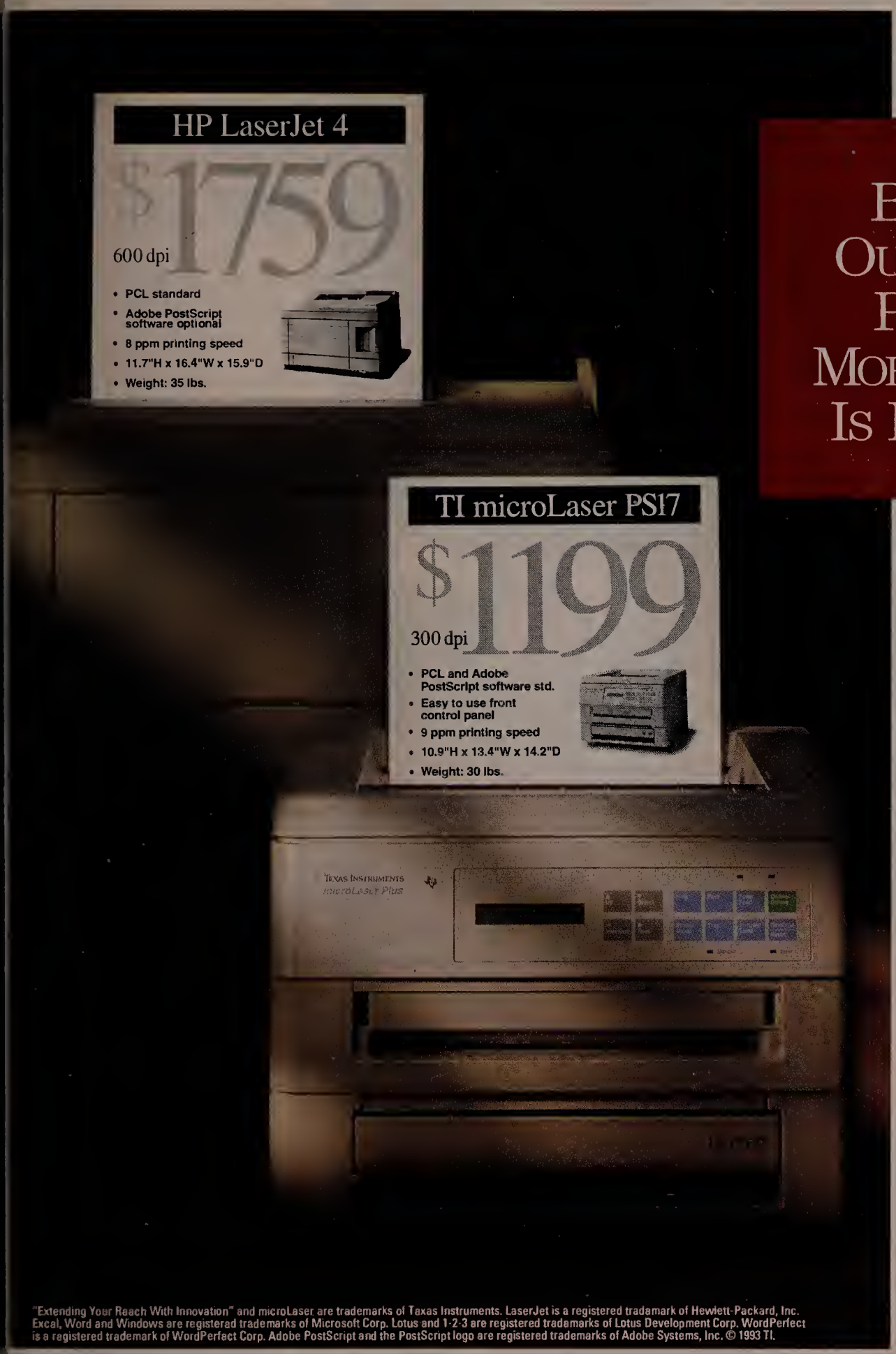
Disk-Efficient Batch Files

Every file on your hard disk takes a minimum of 2K to 8K, depending on your version of DOS and the size of your disk partition. Therefore, having lots of little batch files can waste a good deal of space. One solution is to create a single batch file that, given a parameter, can do the work of many. I call mine RUN.BAT, and I run it with commands like RUN 123 to launch *1-2-3*. Here's a sample:

```
@ECHO OFF
IF %1==X GOTO NOPROG
IF %1==123 GOTO LOTUS
IF %1==wp GOTO WP
IF %1==WP GOTO WP
ECHO NOT SET UP TO RUN %1
GOTO END

:NOPROG
ECHO PLEASE SPECIFY A PROGRAM
ECHO RUN [APPLICATION]
GOTO END

:LOTUS
C:\123\123
GOTO END

:WP
C:\WP51\WP
GOTO END

:END
```

Note that with most options, you must include upper- and lowercase IF . . . GOTO commands (123 is an exception because it contains no letters). You'll need to put the batch file in a directory named in your AUTOEXEC.BAT's PATH statement.

Alan Forro
Greater Cleveland PC Users Group



"Extending Your Reach With Innovation" and microLaser are trademarks of Texas Instruments. LaserJet is a registered trademark of Hewlett-Packard, Inc. Excel, Word and Windows are registered trademarks of Microsoft Corp. Lotus and 1-2-3 are registered trademarks of Lotus Development Corp. WordPerfect is a registered trademark of WordPerfect Corp. Adobe PostScript and the PostScript logo are registered trademarks of Adobe Systems, Inc. © 1993 TI.

By The Way, Ours Also Has PostScript, More Speed And Is Easy To Use.

TI vs. HP.

Both offer advanced graphics capabilities. Superior flexibility with type. Superior paper handling. And more.

But there's one expensive difference. TI microLaser™ PS17 lists for over $500 less than the HP LaserJet® 4.

Better still, TI microLaser PS17 comes standard with the industry graphics preference, PostScript® software from Adobe®. HP LaserJet 4 doesn't. We print 9 pages per minute, they print 8.

We're also easy to use with all of your major software programs, including Word®, WordPerfect®, Excel®, Lotus® 1-2-3® and Windows®.

TI microLaser PS17. It can extend your reach without over-extending your budget. For information and a dealer near you, call *1-800-527-3500.*

POSTSCRIPT™ Software From Adobe

EXTENDING YOUR REACH WITH INNOVATION™

TEXAS INSTRUMENTS

Circle 242 on reader service card

Save Disk Space

PKZIP version 2.0

PC WORLD

WORLD CLASS AWARD

PKWARE introduces the next generation of its award winning compression utility, giving even greater performance levels than achieved with previous releases of the software. PKZIP compresses and archives files, saving disk space and reducing file transfer time.

Software developers, you can significantly reduce product duplication costs by decreasing the number of disks required to distribute your applications. Call for Distribution License information.

Put Your Executables on a Diet

Software Developers, save disk space and media costs with smaller executables. You can distribute your software in a compressed form with PKLITE Professional.™ PKLITE Professional also gives you the ability to compress files so that they cannot be expanded by PKLITE, hindering reverse engineering of your programs.

PKLITE increases your valuable disk space by compressing executable (.EXE and .COM) files by an average of 45%. The operation of PKLITE is transparent, all you will notice is more available disk space!

Compression for YOUR Application

The PKWARE Data Compression Library™ allows you to incorporate data compression technology into your software applications. The application program controls all the input and output of data, allowing data to be compressed or extracted to or from any device or area of memory.

All Purpose Data Compression Algorithm compresses ASCII or Binary data quickly. An adjustable dictionary size allows software to be fine tuned for maximum compression or speed. The routines can be used with most popular languages, such as C, C++, Pascal, Assembly, Basic and Clipper.

PKWARE® INC.
The Data Compression Experts®

9025 N. Deerwood Drive Brown Deer, WI 53223
(414) 354-8699 Fax (414) 354-8559
Internet: pkware.inc@mixcom.com

PKZIP $47.00 PKLITE $46.00 PKLITE Professional $146.00
Please add $3.50 S&H per package in the US & Canada, $5.00 overseas.
Wisconsin residents add 5% state sales tax & applicable county sales tax.
Visa and Mastercard accepted, no COD orders. PCW 6/93

Circle 212 on reader service card


```
100 CLS
110 LINE INPUT " file: ", FILEIN$
120 LINE INPUT "OUTPUT: ", FILEOUT$
130 INPUT "(T)ext or (N)umber? ", I$
140 OPEN FILEIN$ FOR INPUT AS #1
150 OPEN FILEOUT$ FOR OUTPUT AS #2
160 IF UCASE$(I$) = "N" THEN
170   DO
180     INPUT #1, R
190     WRITE #2, R
200     LOOP UNTIL (EOF(1))
210   GOTO 270
220 ELSEIF UCASE$(I$) = "T" THEN
230   DO
240     INPUT #1, RECORD$
250     WRITE #2, RECORD$
260     LOOP UNTIL (EOF(1))
270     CLOSE 1
280     CLOSE 2
290   GOTO 900
300 END IF
310 PRINT "OOPS! Invalid choice!"
900 SYSTEM
```

FIGURE 2: BREAK UP FIELDS of a comma-delimited file with CONVERT.BAS.

to it with the second utility, AT.COM. The syntax is similar to DTR: AT *command string* if your modem is on COM1:, and AT COM*n*: *command string* if it's on another port. The command AT Z will reset your modem, while AT DT, followed by a phone number and a semicolon (;), will dial the number (the semicolon tells the modem to stay on the line until you tell it to hang up with an AT H command).

Omar Mody, Dallas

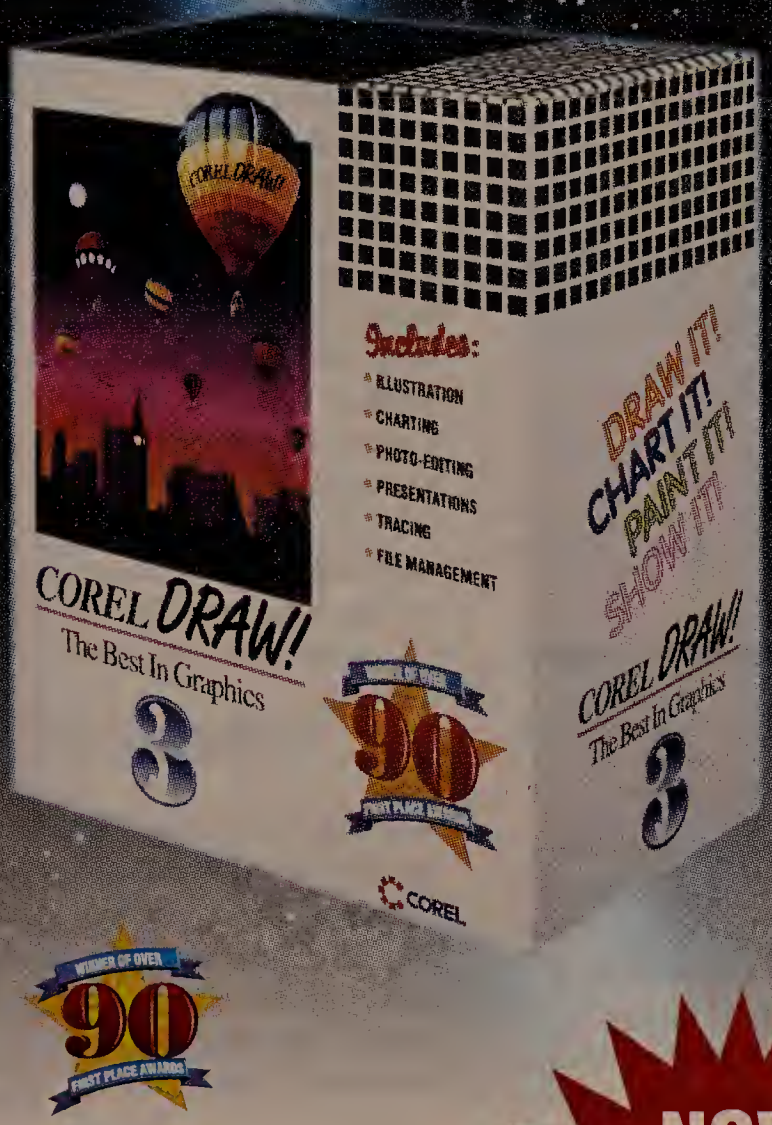
Editor's note: Mr. Mody's utilities are quite well designed, checking to make sure that the port you're accessing exists and, if you run them with a question mark as a parameter, reminding you of the correct command-line syntax. You can create a batch file to automate the dialing job even more:

```
@ECHO OFF
DTR ON
AT DT%1;
PAUSE
AT H
DTR OFF
```

To call a number, you simply pass it to DIAL as a parameter. The batch file will dial the number and then wait for you to

COREL DRAW!

"The Graphics Super Star"



ALL-IN-ONE PACKAGE!

"CorelDRAW has six graphics packages in one stunning Windows program. And these are not watered down versions—they compete feature for feature against stand alone products."

PCComputing MVP 92 WINNER

VERSATILE CHARTS and GRAPHS!

"CorelCHART is the easiest charting package I've ever used, thanks to its intuitive design, ease of object editing, and the smooth integration with the rest of Corel's products."

TOP 100 PC SOURCES

POWERFUL PHOTO-EDITING!

"Corel PHOTO-PAINT is in a class by itself; no other product can match its image editing powers for close to its price range."

PC WORLD WORLD CLASS AWARD

THOUSANDS OF CLIPART IMAGES AND SYMBOLS!

"Even if you only use a portion of the 256 fonts or 14,000 CD-ROM clipart images, you've likely recovered your investment."

INFO WORLD 1992 PRODUCT OF THE YEAR

NEW

PC MAGAZINE EDITOR'S CHOICE March 30, 1993 CorelDRAW, 3.0

EASY TO USE!

"CorelDRAW remains the easiest-to-use graphics product on the market...The ultimate graphics bargain!"

1991 BYTE AWARD OF DISTINCTION

VALUE-PACKED!

"CorelDRAW 3.0 for Windows delivers all the graphics applications you could ask for. The program's ease-of-use, coupled with its power, has users singing its praises."

COMPUTE CHOICE AWARDS

DYNAMIC PRESENTATIONS!

"CorelSHOW, an extremely simple presentation program that makes displaying charts and drawings a snap."

PC WORLD BEST BUY

GREAT TEXT HANDLING!

"CorelDRAW has what many other drawing packages lack: superb control over type...A sizzling best buy."

WINNER OF OVER 90 FIRST PLACE AWARDS!

CorelDRAW has emerged as the ALL-IN-ONE graphics Super Star! Celebrated by top international industry publications, it has won over 90 awards for its exceptional ease of use, incredible value and outstanding features.

CorelDRAW 3.0 outshines the competition! There is no longer any need to buy separate illustration, charting, photo-editing and presentation software, because CorelDRAW 3.0 includes CorelCHART, Corel PHOTO-PAINT and CorelSHOW—all in one value-packed box.

No wonder CorelDRAW is the world's best selling graphics package!

NOW $199 U.S. Funds

CorelDRAW is Network Ready and MULTIPLATFORM for corporate standardization: Windows, OS/2, UNIX, CTOS. Soon available on the Mac and in 20 languages!

Call now for a free demo disk and brochure!

1-800-836-DRAW

CDN TEL: (613) 728-3733 / FAX: (613) 761-9176

MICROSOFT® WINDOWS™-COMPATIBLE

COREL

KUR-0012

Circle 92 on reader service card

press a key before it shuts the modem off, turning control over to you and your phone.

To create the programs, copy **FIGURES 3** and **4** into two ASCII text files called DTR.SCR and AT.SCR, respectively. It's easy to make mistakes when entering this type of data, so check your work carefully; I recommend ehecking the code in vertical columns. Then, type the commands **DEBUG < DTR.SCR** and **DEBUG < AT.SCR** at the DOS prompt. DTR.COM and AT.COM will appear in the current directory; you can move them from there into a directory that's in your AUTOEXEC.BAT's PATH statement. Or you can avoid the whole process by downloading the two programs from the Featured in June folder on PC World Online.

```
Ndtr.com
E100 BE B2 00 FC AC 3C 20 74 FB 3C 3F 74 1D E8 BA 00
E110 3C 43 75 22 AC E8 B2 00 3C 4F 75 1A AC EB 7A 00
E120 3C 4D 75 12 AD B0 FC 3A 74 14 BA A5 01 B4 09 CD
E130 21 BB 01 4C CD 21 BE 82 00 32 DB EB 09 90 2C 31
E140 3C 03 77 E6 8A D8 32 FF D0 E3 BB 40 00 8E C0 26
E150 BB 07 0B C0 75 05 BA E5 01 EB D2 8B D0 83 C2 04
E160 AC 3C 20 74 FB EB 32 00 3C 4F 75 BE AC EB 2A 00
E170 3C 4E 75 17 EC 0C 03 EE BB E2 01 B4 09 BA D2 01
E180 CD 21 BB D3 CD 21 B8 00 4C CD 21 3C 46 75 09 EC
E190 24 FC EE BB DE 01 EB E3 EB 90 3C 61 72 06 3C 7A
E1A0 77 02 2C 20 C3 55 73 61 67 65 3A 20 20 44 54 52
E1B0 20 5B 43 4F 4D 31 3A 7C 43 4F 4D 32 3A 7C 43 4F
E1C0 4D 33 3A 7C 43 4F 4D 34 3A 5D 20 4F 4E 7C 4F 46
E1D0 46 24 44 54 52 20 69 73 20 6E 6F 77 20 24 4F 46
E1E0 46 24 4F 4E 24 50 6F 72 74 20 6E 6F 74 20 66 6F
E1F0 75 6E 64 24
RCX
F4
W
Q
```

FIGURE 3: TURN YOUR MODEM ON AND OFF with the program that this DEBUG script creates.

```
Nat.com
E100 BE B2 00 FC AC 3C 20 74 FB 3C 3F 74 1D EB A6 00
E110 3C 43 75 22 AC EB 9E 00 3C 4F 75 1A AC E8 96 00
E120 3C 4D 75 12 AD 80 FC 3A 74 14 BA 76 01 B4 09 CD
E130 21 B8 01 4C CD 21 BE 82 00 32 DB EB 09 90 2C 31
E140 3C 03 77 E6 8A D8 32 FF D0 E3 BB 40 00 BE C0 26
E150 BB 07 0B C0 75 05 BA A7 01 EB D2 BB D0 B0 41 EB
E160 5F 00 B0 54 E8 5A 00 AC E8 56 00 3C 0D 75 FB BB
E170 00 4C CD 21 00 00 55 73 61 67 65 3A 20 41 54 20
E1B0 5B 43 4F 4D 31 3A 7C 43 4F 4D 32 3A 7C 43 4F 4D
E190 33 3A 7C 43 4F 4D 34 3A 5D 63 6F 6D 6D 61 6E 64
E1A0 73 74 72 69 6E 67 24 50 6F 72 74 20 6E 6F 74 20
E1B0 66 6F 75 6E 64 24 3C 61 72 06 3C 7A 77 02 2C 20
E1C0 C3 50 B3 C2 05 EC 24 20 74 FB 5B B3 EA 05 EE C3
RCX
D0
W
Q
```

FIGURE 4: THIS DEBUG SCRIPT creates a program that sends commands to your modem.

If you have an older 1200- or 300-bps modem, you'll need to lower the baud rate with a command like MODE COM1: 1200,N,8,1.

Note that while AT-.COM sends strings to your modem, it can't receive them; you'll have to watch the modem's lights (or listen to its speaker) to tell that it's gotten your command. If your modem stays silent when it dials, use the command AT M1 to turn on the speaker before you issue your dialing command.

By Brett Glass

Brett Glass is a contributing editor for PC World.

Have a macro, batch file, short program, or general tip you're proud of? Mail your tips to Star-Dot-Star, PC World, *501 Second St. #600, San Francisco, CA 94107; or send them electronically to the Star-Dot-Star forum on PC World Online; CompuServe, 74055, 412; MCI Mail, PC World Editorial; Internet, rogue@well.sf.ca.us; or 415/442-1891 (fax).* PC World *pays $25 to $200 for each tip used. Sorry, we cannot acknowledge unpublished materials.*

PC WORLD GIVES YOU A WINNING HAND!

Tired of flipping through user manuals?

Can't *find* the user manual?

Need lightning-quick access to key commands and features?

Need a software reference you can take anywhere?

PC WORLD'S NEW INSTANT REFERENCE CARD IS YOUR BEST BET.

This monthly pullout card gives you a full house of tips on using essential applications. One side provides basic commands that get you started; side two raises the stakes, with advanced pointers to help experienced users squeeze every bit of productivity out of their software and hardware investment.

LOOK FOR THESE INSTANT REFERENCE CARDS:

WordPerfect
Microsoft Word
Windows 3.0
Procomm Plus
Ventura Publisher
Paradox
Excel
PageMaker
1-2-3
DOS
CompuServe
...and more!

PC WORLD

Instant Reference Card #37

For use with PC World Instant Reference Card Portfolio

MICROSOFT DOS 6.0: UTILITIES

DOS 6.0 includes several utilities to optimize system resources and protect your data. Three of them—Backup, Anti-Virus, and Undelete—also come in *Windows* versions.

Note: Start each command within its respective utility unless otherwise noted. Keys to press are shown in **boldface**. Keys to press simultaneously are joined by a hyphen. A bullet (•) links menu, option, and button names in a series. This Instant Reference Card is the second of two on DOS 6.0; IRC #36 details the DOS 6.0 command line and the DOS Shell program.

OPTIMIZING YOUR SYSTEM

DoubleSpace creates a new logical drive that, by compressing files, nearly doubles the capacity of your hard disk. You must set up one or more compressed drives before the DoubleSpace program will run.

Note: DoubleSpace does not run in *Windows*.

Task	Command
Set up DoubleSpace drives or start DoubleSpace program	**DBLSPACE** at DOS prompt
Compress existing drive, creating new uncompressed drive	**C**ompress • **E**xisting Drive, select drive, **<Enter>**, set amount of free space and drive letter for new uncompressed drive, **C**
Create new compressed drive from free space of existing uncompressed drive	**C**ompress • **C**reate New Drive, select drive with free space, **<Enter>**, set amount of free space to leave free, set compression ratio and drive letter for new drive, **C**
Set compression ratio estimate for selected drive	**D**rive • Change **R**atio, select ratio, **O**K
Change selected drive's size (if reducing, defragment drive first)	**D**rive • Change **S**ize, set number of MB to leave free on uncompressed drive, **O**K
Mount selected drive	**D**rive • **M**ount • **O**K
Unmount selected drive	**D**rive • **U**nmount • **O**K
Format selected drive	**D**rive • **F**ormat • **O**K
Delete selected drive	**D**rive • **D**elete • **O**K
Defragment selected drive	**T**ools • **D**efragment • **Y**es
Check drive	**T**ools • **C**hkdsk • **F**ix/**Ch**eck
Exit DoubleSpace	**D**rive • **E**xit

Defragmenter speeds up disk access by rearranging fragmented file parts (which are scattered about the disk) into consecutive locations.

Note: Defragmenter does not run in *Windows*.

Task	Command
Start Defragmenter	**DEFRAG** at DOS prompt
Select drive to defrag	Type or double-click drive letter
Use recommended method	Select drive, **O**ptimize
Open Optimize menu	**<Esc>** or **C**onfigure
Change defrag method	Open Optimize menu, **O**ptimization Method • **F**ull Optimization/**U**nfragment Files Only • OK
Order files in directories	Open Optimize menu, **F**ile sort, select criterion and order, OK
Begin optimization	Open Optimize menu, **B**egin Optimization
Exit Defragmenter	Open Optimize menu, **E**xit

OPTIMIZING YOUR SYSTEM (continued)

MemMaker optimizes the use of memory on 386 and 486 systems by making maximum upper area available and deriving the order for loading memory-resident programs and device drivers that leaves the most conventional memory free for DOS programs. MemMaker is very simple to use and has on-screen prompts; it can also run unattended. Use MemMaker after adding or removing a memory-resident program or device driver.

Note: MemMaker does not run in *Windows*.

Task	Command
Start MemMaker	**MEMMAKER** at DOS prompt
Run MemMaker unattended	**MEMMAKER /BATCH** at DOS prompt
Undo most recent MemMaker changes	**MEMMAKER /UNDO** at DOS prompt

PROTECTING FILES

Backup copies hard disk files so you can restore them if they're damaged or lost. There are three types of backup: *Full* copies selected files. *Incremental* copies selected files that changed since the last full or incremental backup. *Differential* copies selected files that changed since the last full backup.

Note: Where only one sequence of commands appears, it applies to both DOS and *Windows* versions.

Task	DOS	Windows
Start Backup program	**MSBACKUP**	Launch Backup from Tools group; or Tools • **B**ackup in File Manager
Select type	**B**ackup • Backup **T**ype, select type	
Select target drive/format/directory	**B**ackup • **B**ackup To. Select drive/format, OK; or MS-**D**OS Drive • OK, type path	**B**ackup • Backup **T**o. Select drive/format; or MS-DOS Path, **<Tab>** to or click path box, type path
Print setup file	**F**ile • **P**rint • OK	**F**ile • **P**rint, select mode, OK
Select drive to select files from	**B**ackup. Back**u**p From, select drive; or click drive icon in Backup From box	
Select/unselect all files on drive	**B**ackup. Select drive, **<Space>**; or double- or right-click drive icon in Backup From box	
Select/unselect directory's files	**B**ackup • **S**elect Files. Select directory, **<Space>**; or double- or right-click directory name (not folder). OK	
Select/unselect file(s)	**B**ackup • **S**elect Files, select directory. **<Tab>**, select file, **<Space>**; or double- or right-click file. OK	
Activate/deactivate verification	**B**ackup • **O**ptions • **V**erify Backup Data • OK	
Use/don't use error correction	**B**ackup • **O**ptions • Use **E**rror Correction • OK	
Save file selection, backup type, target, and options	**F**ile • Save Setup **A**s, type file name or double-click name in **F**iles box, **S**ave	**F**ile • Save Setup **A**s. Type file name, OK; or double-click name in **F**iles box. If prompted, confirm overwrite
Backup selected files	**B**ackup. Setu**p** File, select SET file; and/or select files, backup type, target, and options. **S**tart Backup	
Activate/deactivate Restore's verification	**R**estore • **O**ptions • **V**erify Restore Data • OK	**R**estore • **O**ptions • **V**erify Restored Files • OK
Compare/restore backup file(s)	**C**ompare/**R**estore. Select backup set catalog, source, and target. Select Files, select file(s), OK • **S**tart Compare/Restore	

Fold Here

Fold Here

PC WORLD

Instant Reference Card #37

For use with PC World Instant Reference Card Portfolio

MICROSOFT DOS 6.0: UTILITIES

PROTECTING FILES (continued)

Undelete restores deleted files. It has three levels of protection: *Standard*, the default level, can undelete a file until the space it occupied is reused (which can happen when you save new files, install programs, run *Windows*, or open a file in *Windows*). The intermediate *Delete Tracker* stores and reserves the locations of deleted files in a hidden file. *Delete Sentry*, the highest level, stores deleted files in a hidden directory to ensure recovery. The memory-resident Delete Sentry and Delete Tracker use 13.5K of RAM each.

Note: *d* indicates drive; if omitted, default is assumed.

Task	DOS command
Enable Delete Sentry	**UNDELETE /S**[*d*]
Enable Delete Tracker, optionally limit entries to 1 to 999	**UNDELETE /T**[*d*][*–nnn*]
Display drives' current protection level	**UNDELETE /STATUS**
List directory's deleted files, optionally specify recovery method	**UNDELETE /LIST** [**/DS** or **/DT** or **/DOS**]
Recover directory's files	**UNDELETE** [*d:path/filename.ext*]
Recover directory's files using Tracker if Sentry directory exists	**UNDELETE /DT**
Recover directory's files using DOS if Sentry directory or Tracker file exists	**UNDELETE /DOS**
Recover directory's files automatically	**UNDELETE /ALL** [**/DT** or **/DOS**]
Unload Sentry or Tracker TSR	**UNDELETE /UNLOAD**
Reload Sentry or Tracker TSR	**UNDELETE /LOAD**

Task	Windows command
Start Undelete	Launch Undelete from Tools group; or **File** • **U**ndelete in File Manager
Enable Delete Sentry	**O**ptions • **C**onfigure Delete Protection • Delete **S**entry • OK, set options, **D**rives, select drive(s), OK • OK • OK
Enable Delete Tracker	**O**ptions • **C**onfigure Delete Protection • Delete **T**racker • OK, select drive(s), OK • OK
List a directory's deleted files	**D**rive/Dir or **F**ile • Change **D**rive/Directory
List deleted file(s) in current drive by name/content	**F**ind or **F**ile • **F**ind Deleted File, type name and/or contents, OK
Sort deleted files list	**S**ort by or **O**ptions • **S**ort by, select order criterion, OK
Get info on file surrounded by selection box	**I**nfo or **F**ile • File **I**nfo
Select/unselect file(s) in list	Click name; or cursor to name, **<Space>**
Select file(s) by name	**O**ptions • Select **b**y Name
Unselect file(s) by name	**O**ptions • **U**nselect by Name
Print deleted files list	**P**rint or **F**ile • Print **L**ist
Undelete selected file(s)	**U**ndelete or **F**ile • **U**ndelete
Undelete selected file(s) to other drive/directory and optionally rename	**U**ndelete or **F**ile • Undelete **t**o
Purge Delete Sentry file(s)	**F**ile • **P**urge Delete Sentry File
Exit Undelete	**<Alt>–<F4>** or **F**ile • **E**xit

Fold Here

PROTECTING FILES (continued)

Anti-Virus detects and removes more than 1000 viruses. VSafe, a memory-resident program, watches for and reports signs of virus activity.

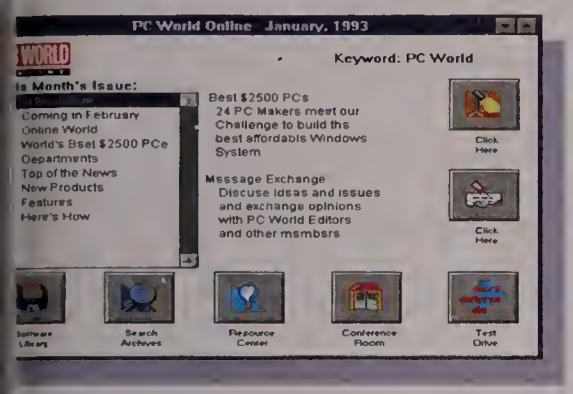
Note: Do not run MS-DOS Setup or *Windows* Setup while VSafe is loaded.

Task	DOS	Windows
Start Anti-Virus	**MSAV**	Launch Anti-Virus from Tools group or **T**ools • **A**ntivirus in File Manager
Select/unselect drive(s) to scan	**<F2>** or **S**elect new drive, *drive letter*	In Drives list: click icon; or cursor to drive, **<Space>**
Scan memory, selected drives	**<F4>** or **D**etect	**D**etect or **S**can • **D**etect
Scan and clean memory, selected drives	**<F5>** or Detect & **C**lean	Detect and **C**lean or **S**can • **C**lean
Stop scanning current drive	**<F3>** or **<Esc>**, **S**top • **O**K	**P**ause • **S**top • **O**K
Get information about virus	**<F9>**, select virus, **I**nfo	**S**can • **V**irus List. Select name, **I**nfo; or double-click name
Print virus list	**<F9>** • **P**rint	**S**can • **V**irus List • **P**rint
Set Anti-Virus to scan memory and default (DOS only) or specified drive(s) automatically	**MSAV** [*d*: [*d*:...]] (add **/P** and/or **/L** to have Anti-Virus close when done; use **/P** for command line interface, **/L** to scan all local hard drives.)	Highlight Anti-Virus icon, **<Alt>–<Enter>**. For each drive to be scanned, add **<Space>***drive letter* **<Colon>** to Command Line. (Add **/P** to have Anti-Virus close when done.)
Delete Checklist files	**<F7>** • **D**elete	**S**can • Delete CHKLIST **f**iles
Activate/deactivate stealth virus detection	**<F8>** or **O**ptions, Anti-**S**tealth (leave **V**erify Integrity checked), **O**K	Options • Set **O**ptions • Anti-**S**tealth (leave **V**erify Integrity checked), OK
Disable/enable alarm sound	**<F8>** or **O**ptions, **D**isable Alarm Sound	Options • Set **O**ptions • **D**isable Alarm
Save/lose settings on exit	**<F3>** or **E**xit, **S**ave Configuration • **O**K	Options • **S**ave Setting on Exit
Exit Anti-Virus	**<F3>** or **E**xit, **O**K	**<Alt>–<F4>** or **S**can • **E**xit Anti-Virus
Load VSafe	**VSAFE** (to load TSR automatically when PC starts, add command to AUTOEXEC.BAT)	Load before *Windows* and add **MWAVTSR.EXE** to load= line in [windows] section of WIN.INI
Toggle VSafe option(s)	**<Alt>–V** • *number* • **<Esc>**	**<Enter>** or Options button, select option(s), OK
Unload VSafe	**<Alt>–V** • **<Alt>–U**	**O**ptions • **E**xit • OK

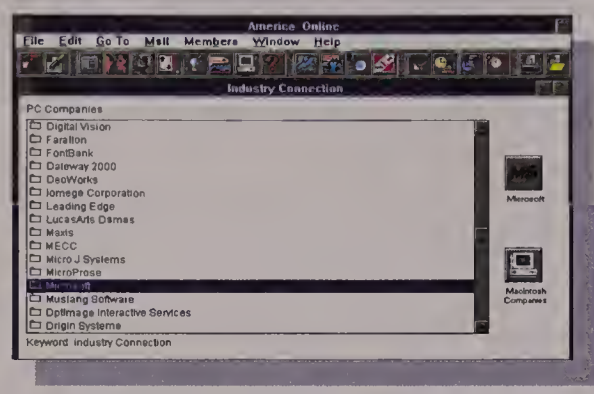
Fold Here

For use with PC World Instant Reference Card Portfolio

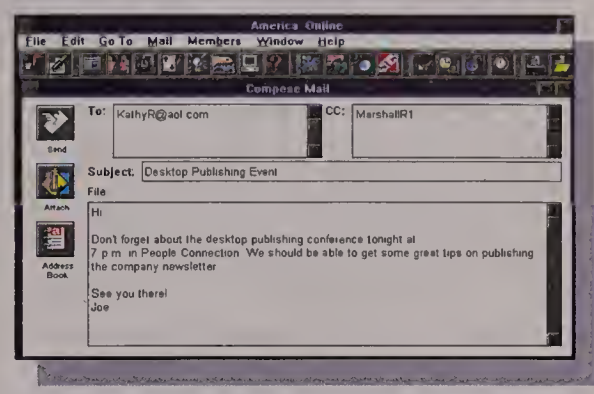
The More Windows You Open, The Cooler It Gets.℠



PC WORLD Online

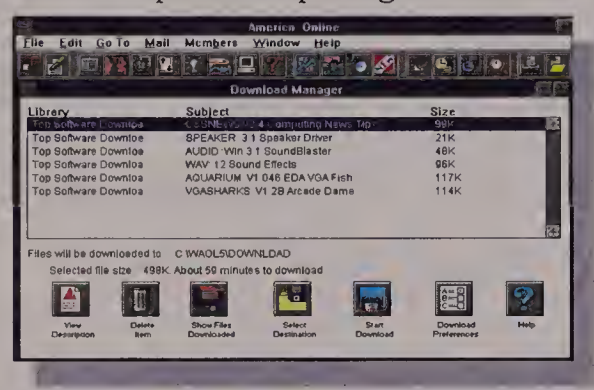


Expert Computing Advice

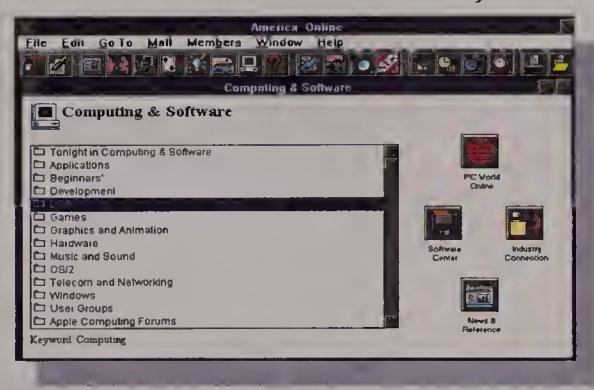


Internet E-Mail Gateway

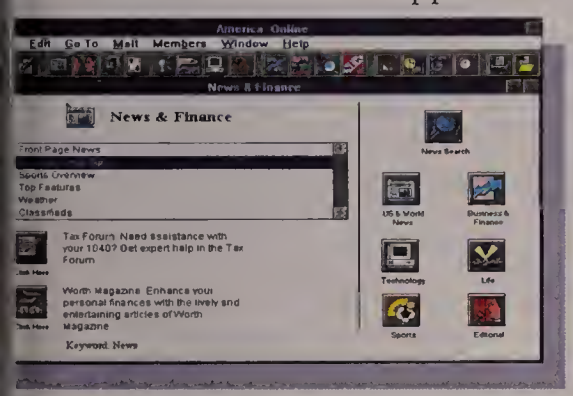
Windows Advice & Support



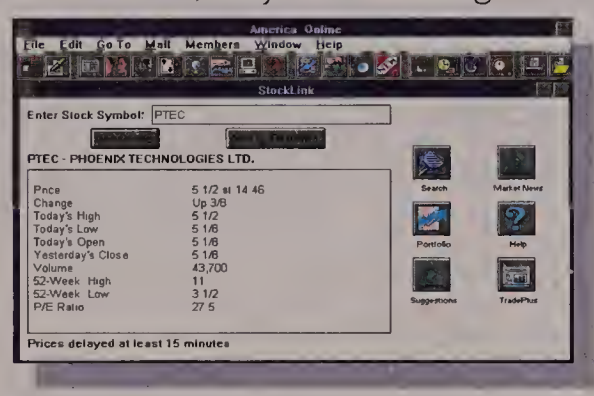
Fast, Easy Downloading



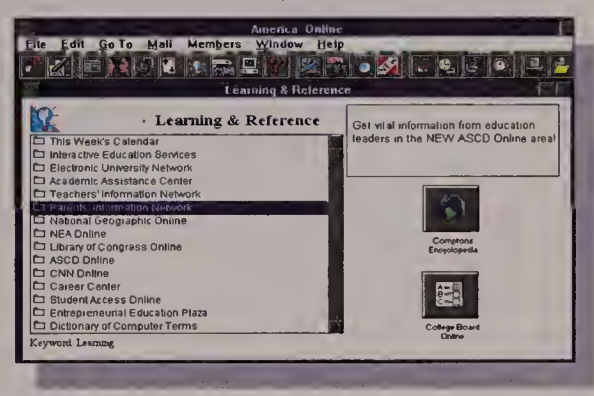
More Than 30,000 Software Files



Searchable News



Stock Quotes & Portfolio Management



Encyclopedia & Homework Help

NOW AVAILABLE FOR DOS AND MICROSOFT WINDOWS™

Free Trial Offer. See Other Side For Details.

Yes! I'd Like To Try America Online — Free.

Send me the free software and trial membership. I understand there's no risk — if I'm not completely satisfied, I may cancel without further obligation.

AMERICA Online®

NAME

ADDRESS

CITY

STATE ZIP

( ) HOME PHONE

Disk Type and Size:

❑ 5.25 ❑ 3.5

❑ HIGH DENSITY ❑ DOUBLE DENSITY

Do you use Windows 3.1*?

❑ Yes ❑ No

*You must have ❑ a 386 PC; ❑ 4MB of RAM; ❑ a VGA monitor; ❑ a mouse; ❑ a modem; ❑ and a working copy of Windows 3.1 to use America Online for Windows.

America Online is a registered service mark of America Online, Inc. Windows is a trademark of Microsoft Corporation.

7242/W

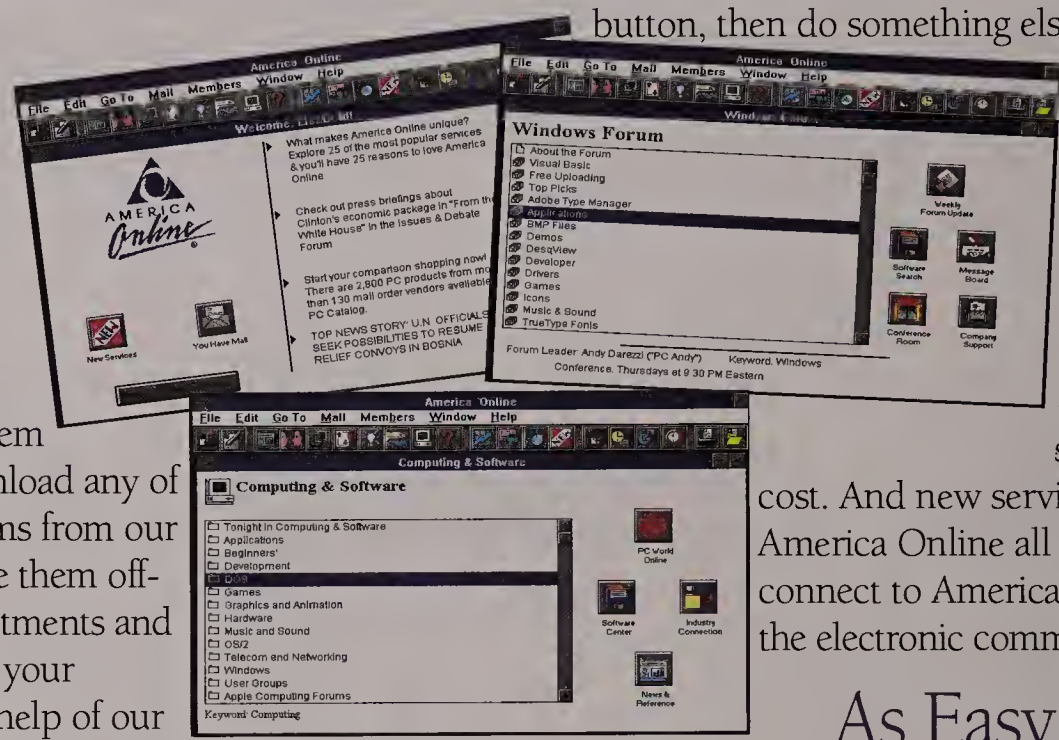
NOW AVAILABLE FOR DOS AND MICROSOFT WINDOWS™

Try America Online—Free.

There's only one way to get the big picture about America Online. Try it. That's why we make it so easy. We give you the software and let you try it, absolutely free. You'll be impressed by everything you can do with your computer, a modem, and America Online, and how easily you can do it.

Just Point and Click.

Get advice from hardware and software developers, experts and reviewers — even ask them questions directly. Download any of the thousands of programs from our software libraries and use them off-line. Monitor your investments and the latest news. Manage your business better with the help of our Microsoft® Small Business Center. Save time and money in hundreds of different ways, from browsing for gifts in our online shopping area or booking your own airline tickets to using our great computing support forums.



New Windows To Open All The Time.

America Online offers multi-file downloading, so you can select the files you want with the click of a button, then do something else while they're downloaded for you. When the downloading is finished, you'll automatically be signed off the service. Our e-mail gateway to the Internet links you to members of other e-mail and online services for no additional cost. And new services are being added to America Online all the time. When you connect to America Online, you connect to the electronic community of the future – today.

As Easy To Try As It Is To Use.

If you've never tried America Online, now's the time. If you have in the past, try us again — America Online is available for DOS and now, the new Windows version for Microsoft Windows 3.1 users – with multi-tasking, flashbar navigation, and much more. But don't take our word for it. Give us a try and find out what you can accomplish when you open a few of our windows.

Complete and mail the card or call 1-800-827-6364, Ext. 7242, Today!

AMERICA Online®

NO POSTAGE NECESSARY IF MAILED IN THE UNITED STATES

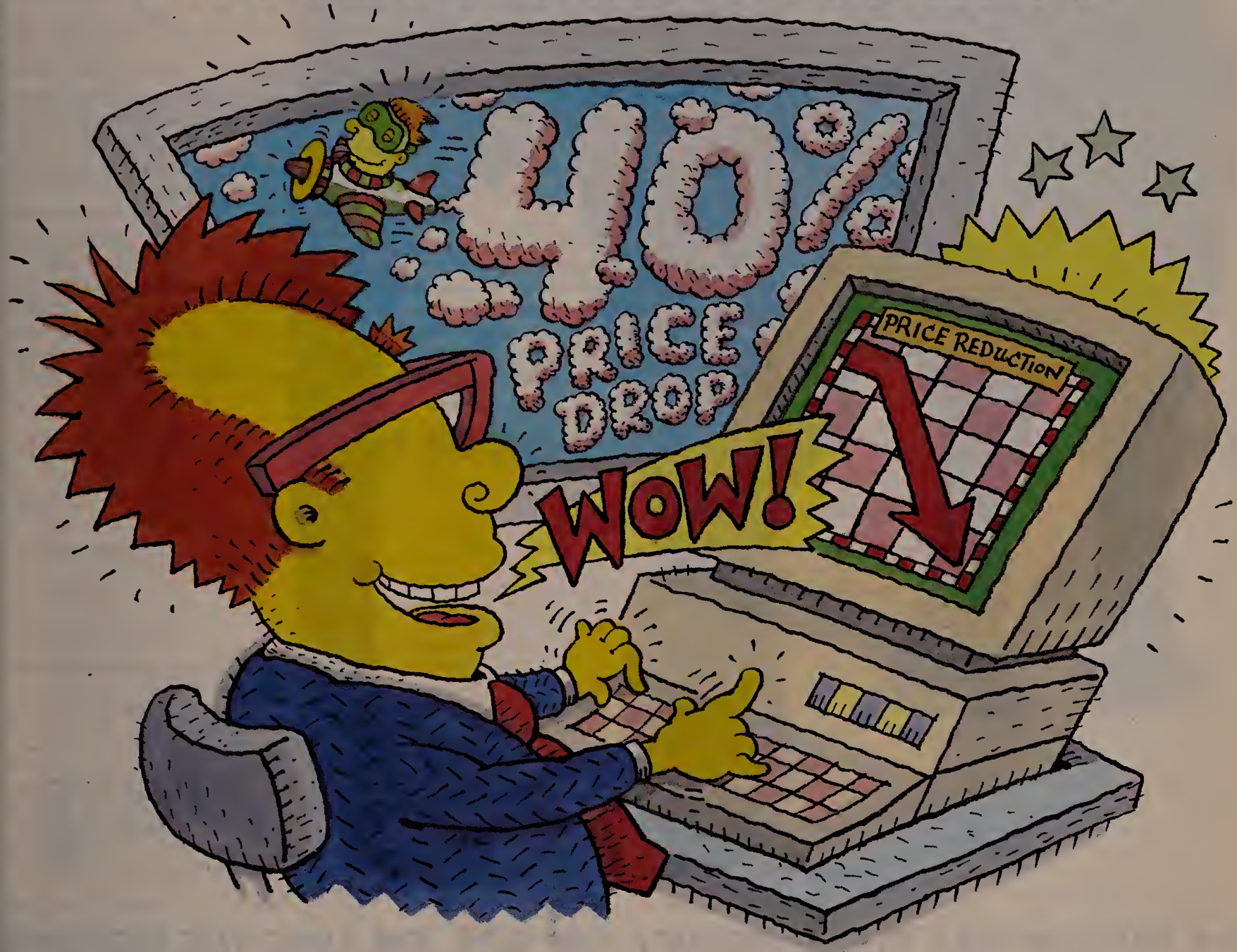
BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO. 9096 VIENNA, VA

POSTAGE WILL BE PAID BY ADDRESSEE

AMERICA Online®

8619 Westwood Center Drive
Vienna VA 22182-9806

40% OFF THE WORLD'S FASTEST FAX MODEMS!



ATTENTION FAX POTATOES, NOW'S YOUR CHANCE TO SAVE.

WAS $549, NOW $299

U.S. Robotics just dropped the price by 40% on the Sportster® and Mac&Fax fax/data modems.

Get Group III fax capabilities. Get 14,400 bps fax/data throughput. Get V.42 / V.42 *bis* error control and data compression. And get all this plus WINFAX™ or Fax STF™ fax software for the Mac bundled free with every Sportster modem you buy.

So fax, Potato, fax. It now costs 40% less.

U.S.Robotics
The Intelligent Choice In Data Communications.

SPORTSTER BUNDLED WITH WINFAX™

CALL U.S. ROBOTICS FOR MORE INFORMATION: 1-800-DIAL-USR.
IN CANADA, PLEASE CALL 1-800-553-3560.

U.S. Robotics Inc. 8100 N. McCormick Blvd. Skokie, Illinois 60076. (708) 982-5010

Sportster is a registered trademark of U.S. Robotics, Inc. All brand or product names are trademarks or registered trademarks of their respective owners. Average price reduction for entire Sportster line. All prices MSRP.

Circle 154 on reader service card

Loxodonta africana
.014 megatons

The Fujitsu DynaMO
128 megabytes

OUR MISSION WAS CLEAR. REDUCE THE SIZE. ENLARGE THE MEMORY.

For the graphic artist, multimedia producer or the busy document image manager, storing large files has always been an enormous problem.

Introducing a very small solution. The new Fujitsu DynaMO.™ It's the highest performance, external, plug-and-play optical drive for PCs and Macs. The first thing you'll notice is its low profile. (It's just 1.5"x5.0"x8.0".) The next thing you'll notice is its mammoth memory. Each re-writable cartridge saves up to 128 megabytes. (Roughly the equivalent of 88 3.5-inch double-density disks.)

The Fujitsu DynaMO. Never before has an optical drive had such an enormous memory with such a small footprint.

And because they're removable, and each data cartridge has a life of 30 years, you have virtually unlimited capacity for all of your storage needs.

Get more information on the Fujitsu DynaMO. Call 1-800-831-4094. Or, to receive the facts by fax, just dial 1-408-428-0456 from your fax machine and request document 1367.

You'll be surprised at how easy it is to store megatons of memory in the smallest model ever.

FUJITSU

COMPUTERS, COMMUNICATIONS, MICROELECTRONICS

©1993 Fujitsu. All rights reserved. DynaMO is a trademark of Fujitsu Computer Products of America, Inc. All brand names and product names are trademarks or registered trademarks of their respective holders.

Circle 153 on reader service card

FAX SURVEY

Win a CD ROM Drive

Fax in your opinions to enter a drawing for a Sony Desktop Library CD ROM drive.

Which articles in *PC World Lotus Edition* are valuable to you? Which aren't? Help us improve the magazine by filling out the questionnaire below. Fax in your response and you'll have a chance to win a Sony Desktop Library CD ROM drive, featured in our May buyers' guide.

HOW TO ENTER: Fax your completed questionnaire, along with your name and phone number, to *PC World* at 415/267-1779. If you have trouble connecting to this number, fax your survey to 415/974-7445 or 415/442-1891. Do NOT fax a cover page. If you don't have a fax machine, you can mail your survey to Lotus Edition Fax Survey, Box 6-LOT, *PC World*, 501 Second St. #600, San Francisco, CA 94107. Send your survey in no later than June 30; we'll notify the winner by mid-July.

HOW TO FILL OUT THE FORM: FOR BEST RESULTS, PHOTOCOPY THIS PAGE; DO NOT TEAR IT OUT. Using black pen, clearly print your name (use block capital letters) and phone number at right; fill the appropriate circle under each digit of your phone number. Below, fill the circles under the answers that apply to each article you read. First tell us whether you read the entire article or just some of it. If you didn't read it at all, leave the line blank. If you read the article, please rate its value to you on a scale from 1 (least valuable) to 5 (most valuable). WHEN FILLING THE CIRCLES, AVOID GOING OUTSIDE THE LINES! One entry per person.

First name

Last name

Daytime phone number

1	○	○	○	○	○	○	○	○	○	○	○
2	○	○	○	○	○	○	○	○	○	○	○
3	○	○	○	○	○	○	○	○	○	○	○
4	○	○	○	○	○	○	○	○	○	○	○
5	○	○	○	○	○	○	○	○	○	○	○
6	○	○	○	○	○	○	○	○	○	○	○
7	○	○	○	○	○	○	○	○	○	○	○
8	○	○	○	○	○	○	○	○	○	○	○
9	○	○	○	○	○	○	○	○	○	○	○
0	○	○	○	○	○	○	○	○	○	○	○

	Did you read it?		Value to you? (Least 1 – Most 5)				
	All	Some	1	2	3	4	5
Sample	◉	○	○	○	○	○	◉
In This Issue (page 19)	○	○	○	○	○	○	○
Letters (page 23)	○	○	○	○	○	○	○
Consumer Watch (page 31)	○	○	○	○	○	○	○
Real Problems, Real Solutions (page 37)	○	○	○	○	○	○	○
Top of the News (pages 42–56)	○	○	○	○	○	○	○
New Products (page 69)	○	○	○	○	○	○	○
Marketplace (page 93)	○	○	○	○	○	○	○
Lotus News (page 98-L2)	○	○	○	○	○	○	○
Add Graphics to Your Worksheet (page 98-L6)	○	○	○	○	○	○	○
Presenting 1-2-3...With Freelance (page 98-L13)	○	○	○	○	○	○	○
Speed Planning and Forecasting (page 98-L19)	○	○	○	○	○	○	○
Notes 3.0: More Power to Groups (page 98-L22)	○	○	○	○	○	○	○
Improving Your Skills (page 98-L29)	○	○	○	○	○	○	○
Macro Basics (page 98-L33)	○	○	○	○	○	○	○
Advanced Macros (page 98-L35)	○	○	○	○	○	○	○
Q&A (page 98-L39)	○	○	○	○	○	○	○
486s for $1250 (page 100)	○	○	○	○	○	○	○
50 Spreadsheet Tips (page 134)	○	○	○	○	○	○	○

	Did you read it?		Value to you? (Least 1 – Most 5)				
	All	Some	1	2	3	4	5
Windows NT: The New DOS? (page 161)	○	○	○	○	○	○	○
Word Processor or Desktop Publisher? (page 178)	○	○	○	○	○	○	○
Databases Come to Windows (page 188)	○	○	○	○	○	○	○
Caches Pay Off (page 212)	○	○	○	○	○	○	○
Help Line (page 220)	○	○	○	○	○	○	○
Spreadsheets (page 224)	○	○	○	○	○	○	○
Word Processing (page 230)	○	○	○	○	○	○	○
Windows (page 236)	○	○	○	○	○	○	○
Data Management (page 240)	○	○	○	○	○	○	○
Publishing & Presentations (page 244)	○	○	○	○	○	○	○
Communications (page 248)	○	○	○	○	○	○	○
Hardware (page 250)	○	○	○	○	○	○	○
Star-Dot-Star (page 254)	○	○	○	○	○	○	○
Reference: DOS 6.0 Utilities (page 259)	○	○	○	○	○	○	○
Business Fixtures (page 293)	○	○	○	○	○	○	○
Games: Break Time (page 297)	○	○	○	○	○	○	○
Home Office (page 300)	○	○	○	○	○	○	○
HOW WOULD YOU RATE THIS ISSUE OVERALL?			○	○	○	○	○

Are you involved in any of the following ways in the purchase of PCs or PC products for your company or organization? (Choose all that apply.)

- ○ Suggest product brands
- ○ Determine need for product
- ○ Determine features needed
- ○ Evaluate brands or models
- ○ Recommend brands or models
- ○ Approve purchase
- ○ Recommend purchase channels
- ○ Make purchase
- ○ Have other purchase involvement

In the next 12 months are you likely to be involved in buying PCs for yourself or your company or organization?

For yourself ○ Yes ○ No

For your company ○ Yes ○ No

Do you have a business problem you need to solve with *1-2-3* or another Lotus application? Are you struggling with a spreadsheet model or macro? Tell us about it—jot down your problem here or send a note to Submissions Editor, *PC World Lotus Edition*, 77 Franklin St. #300, Boston MA 02110.

PLEASE FAX TO 415/267-1779

PC WORLD CATALOG

Shop The PC World Catalog For Fast Solutions To Your PC Needs

The *PC World* Catalog is the most cost efficient way to bring your product message to managers proficient with PCs, the group identified by study after study as today's key buyers of computers and related equipment.

Your message can reach buyers in a variety of ways. The "Business Class" section brings your ad to our 901,000 readers with four-color impact. *PC World's* "Computer Showplace" section highlights your ad in black and white, with a choice of display or text/only formats (standard red can be added as a second color).

For complete information on Catalog advertising, please call toll-free 800-262-9885 or 203/838-1425 Fax. PC World Catalog, c/o RAM, 50 Washington Street, South Norwalk, CT 06854.

Advertising Sales Staff

Pat Fales
Catalog Manager
203-857-5120

Dean Lucente
Western Account Manager
203-857-5102

Sally Naylor
Catalog Coordinator
203-857-5100

Chris Kimball
Eastern Account Manager
203-857-5101

Product Category	Business Class	Computer Showplace
HARDWARE		
Bios Chip		270
Communications	267	270
Computer/Systems	267	270
Peripherals	267-268	270
SOFTWARE		
Accounting	269	
Business Applications	269	272
CD Rom	269	
Church Applications		273
Data Entry		273
Educational		273
Financial		273
Flow Charting		273
FORTRAN		273
Graphics		273
Inventory Control/Management		273
Mailing Programs		274
Mail Order		274
Maintenance Management		274
Medical		274
Music		274
On-Line Services		274
Point of Sale		274
Public Domain/Shareware		274
Real Estate		275
Schools Applications		275
Science	269	
Security		275
Surveys		275
Utilities		275
MISCELLANEOUS		
Accessories	268	270
Bar Coding		270-271
Business Opportunities		270
Computer Insurance		271
Data/Disk Conversion		272
Disk Copy Service		272
Disks		271
On-Line Services	268	
Presentation	268	
Supplies		272
Toner Recharge		272

PC-COMPANION PLUS™

Add a second Keyboard, Monitor and Mouse up to 250 feet from your PC!

- PC/AT, PS/2 and 100% Compatibles
- Supports VGA up to 1024 x 768
- Use either PS/2 or Serial Mice
- Combine monochrome and color VGA

Made in USA

Dealer Program Available

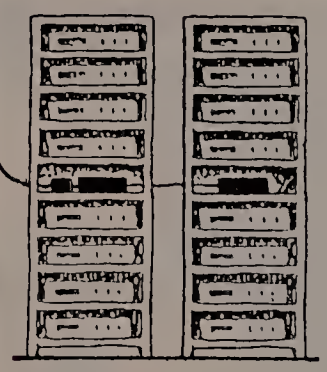
CYBEX

2800-H Bob Wallace Ave. • Huntsville, AL 35805 U.S.A.
(205) 534-0011 • FAX (205) 534-0010

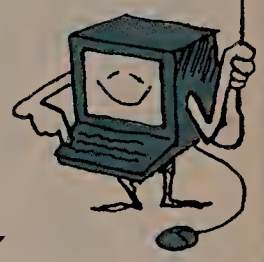
CIRCLE S16 ON READER SERVICE CARD

COMMANDER

CONTROL UP TO 96 PC FILE SERVERS WITH 1 KEYBOARD, MONITOR, AND MOUSE



- Select via Keyboard
- Dual access to 150 feet away (optional)
- "AutoBoot™" Feature boots attached computers without operator intervention
- Use either PS/2 or Microsoft serial mouse with available cables
- Each unit accommodates from 2 to 8 PCs; cascade up to 12 units



CYBEX

2800-H Bob Wallace Ave. • Huntsville, AL 35805 U.S.A.
(205) 534-0011 • FAX (205) 534-0010

Dealer Program Available **Made in USA**

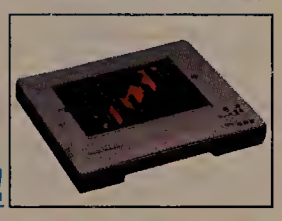
CIRCLE S17 ON READER SERVICE CARD

Specialists in LCD Projection

BUY•LEASE•RENT

For Business & Tutorial Presentations

- PC / Mac / Video Projection
- Color from $2,395 to $7,395
- 640 x 480 to 1024 x 768



Call Now For a FREE Catalog!

Panelight DISPLAY SYSTEMS, INC.

1·800·726·3599

IN SAN FRANCISCO CALL: 415-772-5800

1040 Ferry Building, #263 San Francisco, CA 94111

CIRCLE 406 ON READER SERVICE CARD

LIQUIDATION

NOTEBOOKS

386SX20 3mb RAM, 60mb HD **$995**

386SXL 25 MHz 5mb RAM, 60mb HD **$1295**

486SLC 25 MHz 4mb RAM, 80mb HD **$1595**

LASER PRINTER

For MAC & PC 4ppm

- Postscript
- HPII Compatable
- Canon Engine
- 2mb RAM
- 16 MHz RISC Processor
- Parallel, Serial, Apple talk interfaces

$895

SONY CD-ROM

With Card & Caddy **$269**

VISA MasterCard Cards DISCOVER

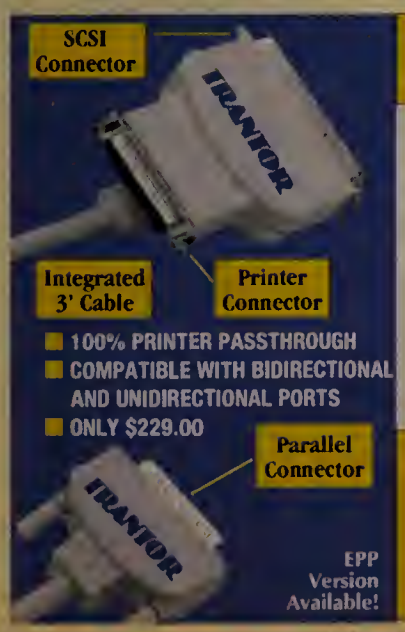
- Corporate, Government and School PO's welcomed.
- COD Cashier's Check or Money Order.
- Company and personal checks accepted.
- California residents must add applicable sales tax.
- Prices do not include shipping.

jb TECHNOLOGIES, INC.

5105 Maureen Lane, Moorpark, CA 93021

TEL 805-529-0908
FAX 805-529-7712

CIRCLE 407 ON READER SERVICE CARD



- 100% PRINTER PASSTHROUGH
- COMPATIBLE WITH BIDIRECTIONAL AND UNIDIRECTIONAL PORTS
- ONLY $229.00

MiniSCSIplus

HIGH-PERFORMANCE PARALLEL-TO-SCSI ADAPTER

Connect up to 7 SCSI devices to your parallel port! The **MiniSCSI Plus** lets you run a CD-ROM, tape drive, SCSI hard disk, SyQuest, Bernoulli or other SCSI device and still use your printer port.

TRANTOR

Trantor Systems, Ltd.
5415 Randall Place • Fremont, CA 94538
(510) 770-1400 • **Fax:** (510) 770-9910

Call Today! (800) 872-6867

© 1993 Trantor Systems Ltd. MiniSCSI and MiniSCSI Plus are trademarks and Trantor is a registered trademark of Trantor Systems Ltd. All other product names are trademarks of their respective companies

"This product...is darned near perfect."
–Jerry Pournelle, Byte Mag. March 1993

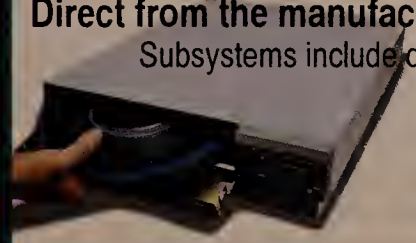
"...even more elegant than its predecessor and almost twice as fast."
–Jim Seymour, PC Mag. December 1992

CIRCLE 469 ON READER SERVICE CARD

9-Track for PCs

Mainframe to PC data interchange

Rock solid solutions, rock bottom prices.
Direct from the manufacturer. 1600 & 6250 bpi.
Subsystems include drives and software.



800-729-8725

OVERLAND DATA®
Since 1980

Tel: 619-571-5555 • FAX: 619-571-0982
Europe: Tel: (+49) 6172-35027 • FAX: (+49) 6172-35028

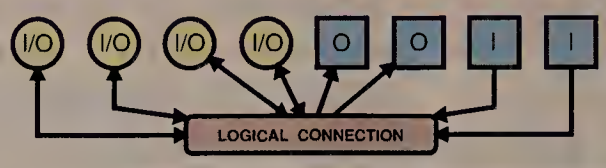
3480 Now With IDRC!

Ask about 3480 tape drives too

CIRCLE 430 ON READER SERVICE CARD

PRINTER SHARING & MEMORY

I/O = input /output
◯ = serial
▢ = parallel



800-238-9415

LCX-1000 (1Mb) **$495**
8 ports; 4 serial I/O; 57,600 bps
2 parallel in, 2 parallel out

LC-256 (256Kb) **$375**

LC-512 (512Kb) **$425**
8 ports; 4 serial I/O; 19,200 bps
2 parallel in, 2 parallel out

LXFR-ETC **$49**
Windows & OS/2 File Transfer
4 user license, for LC or LCX

PB-42PP-256Kb **$199**

PB-42PP-1Mb **$249**
6 parallel ports; 4 in / 2 out
Upgradable to 4Mb; 25,000 cps

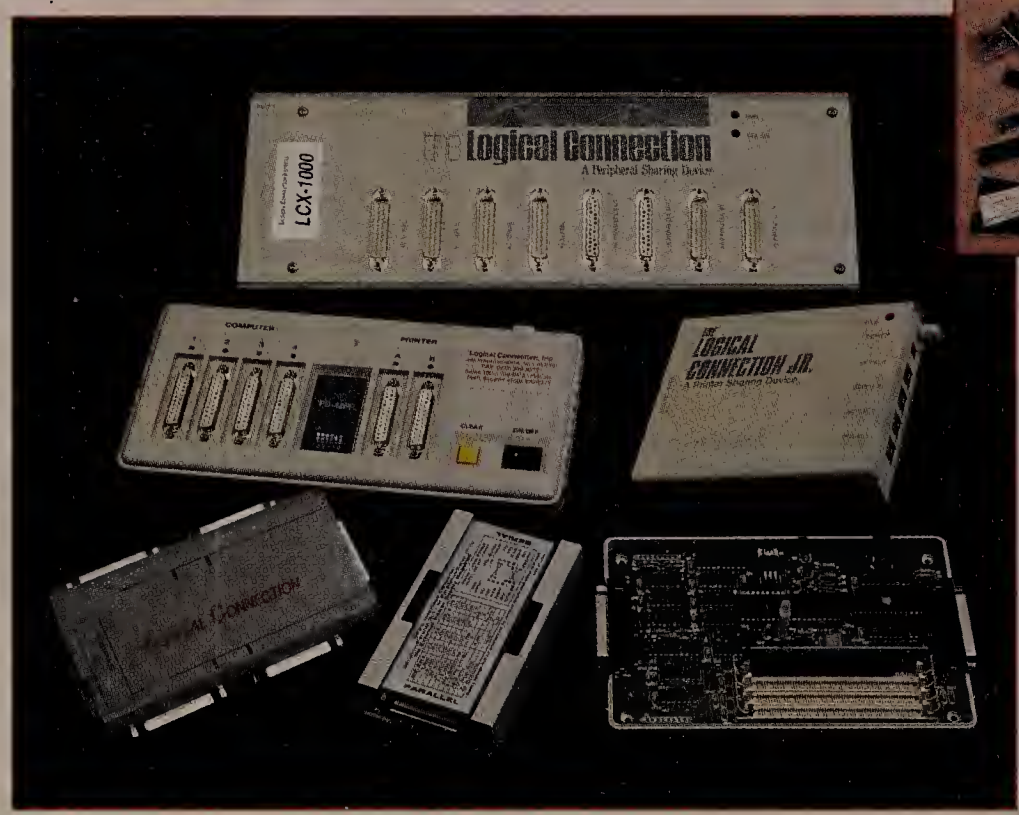
LC-41PAS **$69**
5 parallel ports; 4 in / 1 out
Smart-switch; 25,000 cps

LC Jr.-256 (256Kb) **$199**

LC Jr.-512 (512Kb) **$249**
5 ports; 4 serial in, 1 parallel out
Up to 115,200 bps

SPPS **$49**
9600 bps to 115,200 bps
Serial / Parallel Converter

PB-11PP-1Mb **$199**
2 parallel ports; 1 in / 1 out
Upgradable to 16Mb; 75,000 cps



PCMCIA 2.0 *SRAM Cards:*
512Kb - $120, 1Mb - $175, 2Mb - $295

Toshiba:
1000XE/SE/LE, 1800, 1850, 2000,2000SX/SXE, 2200SX
2Mb - $90, 4Mb - $150, 8Mb - $275
3300SL
4Mb - $150, 6Mb - $225
4400SX
4Mb - $150, 8Mb - $275

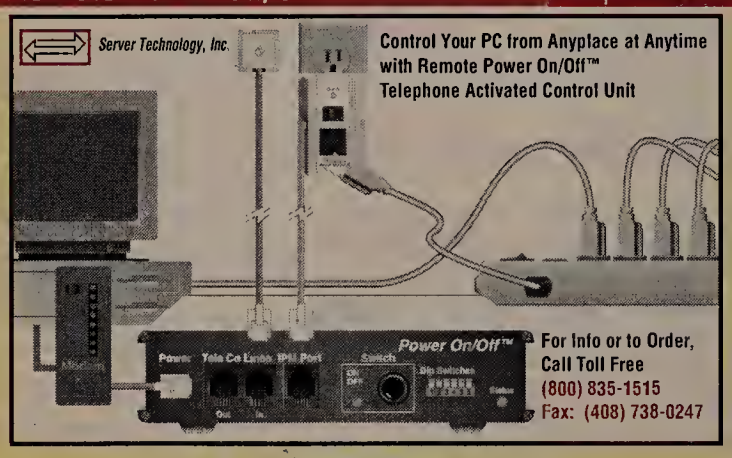
Powerbook & MAC:
100/140/145/170/160/165/180
6Mb - $250, 8Mb - $310, 10Mb - $390
DUO 210/230:
6Mb - $260, 8Mb - $320, 10Mb - $410
Cent.610/650, Quad.800, LCII!
4MB - $145, 8Mb - $260

MAC SIMMs (70ns.):
1x8 - $32, 4x8 - $124, 16Mb - $495

LOGICAL CONNECTION® 4660 Portland Road NE #108 Salem, OR 97305-1658 Tech.: (503) 390-9375 **FAX: (503) 390-9372**

CIRCLE 420 ON READER SERVICE CARD

Remote Power On/Off™ $169.95



CIRCLE 410 ON READER SERVICE CARD

Get on the Internet!

5 Hours FREE!

DELPHI is now connected to the Internet! With over 4 million users, the Internet is the fastest growing and most talked about online resource in the world.

- **YOURNAME@delphi.com** — use DELPHI's real-time e-mail connection to send messages or subscribe to mailing lists.
- **Telnet** — connect to colleges, companies, and other networks.
- **FTP** — transfer files immediately from other hosts.

Here's How:

Dial by modem
1-800-365-4636

At Password,
type **PCW36**

Questions? 1-800-695-4005

VGA makes it to the BIG SCREEN

- The only unit that can be used world-wide (NTSC & PAL switchable)
- Ready to plug in and play
- Creates professional media presentations
- Carry in your briefcase with room for your laptop
- Full one-year credit toward upgrades
- Full one-year replacement warranty
- Toll-free technical support

VGA Mate®

$169
NTSC & PAL switchable

Bring the true *feeling* to your Multi-Media Presentation with
Holophonics™
A total audiovisual experience for all. **$23.99**
100% credit toward a purchase of Holophonics™ on Floppy disk
Volume 1

Calpac Computer Corporation
53 Moody Court, Thousand Oaks, CA 91360
805-379-1312 805-379-2653 FAX
1 800 800-7222

CIRCLE 501 ON READER SERVICE CARD

AWARD WINNING ACCOUNTING SOFTWARE

"Best Buy Award" six years running from Computer Shopper and Computer Monthly magazines.
ACT includes:

General Ledger-Accounts Payable-Accounts Receivable-Payroll-Check Reconciliation-Inventory-Purchase Order-Order Entry-and LYNX (ASCII file convertor)

ACT is quick and easy to install, features on line editable help files, complete easy to use documentation, point and shoot cursor control, stacked menu system, prints W-2s, 941s, and 1099s, and plain paper forms.

During the past eleven years, ACT has developed a reputation for being extremely powerful, and flexible. FEATURE FOR FEATURE, BENEFIT FOR BENEFIT, AND DOLLAR FOR DOLLAR, you can't buy a better accounting software package.

ACT series comes in single user, LAN, and UNIX versions, WITH a 30 day money back guarantee! (15% restocking fee)

single user version **$199.50** plus shipping & handling

(800)388-3038

Cougar Mountain Software
2609 Kootenai Boise, Idaho 83705

CIRCLE 401 ON READER SERVICE CARD

Starting Your Business™

THE COMPLETE BUSINESS STARTUP SOFTWARE FOR TODAYS ENTREPRENEUR

WINDOWS & DOS NOW FOR

SUCCESSFULLY START ANY business with this integrated software for the IBM-PC. Ease through steps, worksheets, business licences, incorporating, federal regulations, taxes, financing and more!

Call 1-800-783-7053
or fax 1-205-967-3721

DMACS SOFTWARE

Order direct & save: $79 (Retail:$105)
60 day money back guarantee

CIRCLE 408 ON READER SERVICE CARD

CDROMS ■ CDROMS ■ CDROMS

Full money-back guarantee.

VISA/MC/AE/COD

Walnut Creek CDROM
1547 Palos Verdes Mall
Suite 260
Walnut Creek, CA
94596

+1-800-786-9907
+1-510-674-0783
FAX +1-510-674-0821

Simtel20 MSDOS CDROM $24.95*
Over 600 megs in 9000+ files. Programming tools, DOS utilities, tech docs, comm, BBS, publishing, ham-radio, education, and much more. BBS support. December 1992.

CICA MicroSoft Windows CDROM $24.95*
Hundreds of MS Windows programs. Games, utilities, source code, and programming tools. BBS support. March 1993.

Hobbes OS/2 CDROM $24.95*
Thousands of OS/2 programs, including games utilities, and drivers. November 1992.

The C Users' Group Library CDROM $49.95
The entire library of C and C++ source code, volumes 100-364.

Giga Games CDROM $39.95*
Thousands of games for MSDOS and MS Windows. Arcade, word, strategy, and educational games. March 1993.

CDROM Caddies $4.95

* Shareware programs require separate payment to authors if found useful.

CIRCLE 416 ON READER SERVICE CARD

BUY LOW. SELL HIGH.

PC WORLD'S Business Class section offers four-color selling power at super low prices. What, you didn't know color ads outsell black and white by over 40%? But get this: your quarter page ad (on a typical, twelve time rate) will run for only $4560 per issue! Can you afford NOT to advertise in Business Class?

Call the PC WORLD Classified Department NOW for details.
800/262-9885

Advertising Age Reports:

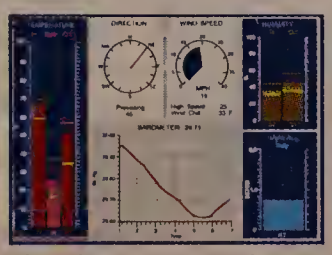
PC WORLD's *ad sales jumped 23.3% during last year's "recession".*

Why? Because products sell when advertised in these pages. Every issue, every day, in good years and bad, PC WORLD *works.*

Contact Catalog sales today:
800/262-9885

WEATHERLINK

The Ultimate In Weather Monitoring!



- Create daily, weekly, monthly, yearly plots
- Compare two weather conditions on the same graph
- Plot two days, weeks, months, or years on the same graph
- Store data for up to 4 months before transferring to the PC
- Monitor conditions at remote locations using a modem

The ultimate in weather monitoring systems, Weatherlink works with any of Davis' weather stations to bring the weather to your PC!
• IBM compatible, 640K RAM required • Hercules, CGA, EGA, and VGA

Call Today: 1-800-678-3669 M-F 7 a.m. to 5:30 p.m. Pacfic Time
30-day money-back guarantee • M/C and VISA • FAX 1-510-670-0589 • PW380U

DAVIS INSTRUMENTS 3465 DIABLO AVE., HAYWARD, CA 94545

CIRCLE 498 ON READER SERVICE CARD

Hardware

BIOS CHIPS

UPGRADE YOUR XT, 286 or 386!

Our experienced techs can specify a new BIOS ROM to add IDE hard drive, DOS 5.0 and Windows 3.1 support. A new Motherboard can change your slower machine into a 386 or 486 powerhouse. Full size TEK sheets make it easy.

Call for FREE Catalog

KOMPUTERWERK, INC.

800 423-3400 (412) 782-0384

CIRCLE 488 ON READER SERVICE CARD

COMPUTER SYSTEMS

USED COMPUTERS

IBM, COMPAQ & MAJOR BRANDS
Also IBM PCjr & Convertible
Accessories, & Service.
Computers from $99
Monitors from $49
New CGA Color Monitors $129
IBM 5140 Laptops $349
Software, Keyboards, Parts
Hard to find parts
FREE CATALOG
Call (214) 276-8072
P.O. Box 461782
Garland, TX 75046-1782
FAX & BBS (214) 272-7920

COMMUNICATIONS

FAX-ON-DEMAND + VOICE PROCESSING

dVOICE's™ features include:

- One call fax mode
- Fax back mode
- Voice mail
- Text to speech
- High level programming language
- Inbound and outbound capabilities
- Automated receptionist
- Built-in database capabilities

MULTIVERSE • 212-580-0541

PERIPHERALS

9-Track 3480

Fastest, Most Reliable Drives for Micro's

6250
3200
1600
800

Intuitive Software, Super Support, & SCSI Too!

MAINFRAME 9-TRACK for MICRO's

800/842-0708

HAUPPAUGE, NY • 516/273-5900

TDX PERIPHERALS

The Only Professional Choice

CIRCLE 513 ON READER SERVICE CARD

Turn Your HP® LaserJet™ Printer Into a Plain Paper Receive FAX Machine

What makes FAXME so practical is its quality, its performance, its value... and the security that comes with our Lifetime Warranty!

Compatible only with LaserJet Series II and III.

FAXME
MSRP $259
ELEK-TEK PRICE
$179.99

PRACTICAL PERIPHERALS

Since 1979
ELEK-TEK®
Call (800) 395-1000
(708) 677-7660 in Illinois
Over 5,000 National-Branded Computer Products
Everyday Discounted Prices
Toll-Free Ordering with FREE Technical Support
Same Day Shipping on all In-Stock Items
Corporate Accounts invited.
7350 N. Linder Ave. Skokie, IL 60077
BP003

CIRCLE 418 ON READER SERVICE CARD

PERIPHERALS Cont.

Save BIG $$$ on printing costs!!!

MacInker™

Better than new cartridges for less than 5¢

Over 200,000 sold. Beautiful printing and longer printhead life. Call for complete information.

Epson MacInker	48.00
Universal Cartridge Model	79.45
MultiColor Adapter	40.00

Jet-Master™

Re-usable jet-printer recharge kit. Just buy ink later as needed.

- Simple, trouble-free operation.
- Average recharge cost is $1-$2.
- Most jet-printers supported, single and multicolor.
- Brilliant, bold color inks available for HP cartridges.

HP Deskjet	24.95
HP 4-color	49.95
HP QuietJet	26.95

ComputerFriends, Inc.
14250 NW Science Park Drive
Portland, OR 97229
To Order 1-800-547-3303
Tel. (503) 626-2291

CIRCLE 483 ON READER SERVICE CARD

Miscellaneous

ACCESSORIES

FREE GLOBAL CATALOG

204 page guide to computer furniture, supplies and accessories

Dial Toll-Free
1-800-8-GLOBAL

GLOBAL COMPUTER SUPPLIES
11 Harbor Park Dr., Dept 91 PCW
Port Washington, NY 11050

CIRCLE 508 ON READER SERVICE CARD

BUSINESS OPPORTUNITIES

Own a Billing Service!

Great part time PC based business. Provide invoicing and accounts receivable services to small businesses. $500-5000 income monthly. $289 for complete set-up incl; Software, proven marketing plan, promotional materials, and ongoing support.
Bluejay Systems
2579 Clematis Street
Sarasota, FL 34239
(813) 365-3357

BAR CODING

Bar Code Reader for PC, XT, AT, PS/2 and MAC — $295

- Reads all popular bar codes
- Rugged aluminum housing
- No software/hardware modifications
- Stainless-steel wand
- 5-Year Warranty
- Works with any program or operating system
- Withstands 6ft. Drop to Concrete

Portable Bar Code Reader for PC or Macintosh — $645

- 36-Key Alphanumeric Key-Pad
- 32K RAM expandable to over 1 MB
- Easily programmable screen prompts
- Complete with Hewlett-Packard wand
- Data stored in ASCII Text Format
- Communications Software and Cable Included

TPS Electronics
800-526-5920
Call Toll-Free U.S. & Canada
FAX: 415-856-3843

All TPS products carry 30-Day Money-Back Guarantee

MasterCard VISA AMERICAN EXPRESS

4047 Transport Street, Palo Alto, CA 94303 Phone: 415-856-6833

CIRCLE 434 ON READER SERVICE CARD

EZ Barcode®

- On-line readers • Portable readers
- Label design software
- Wand/CCD/laser/mag stripe input
- The best warranty in the industry

Call for FREE catalog

TimeKeeping Systems, Inc.

1306-C East 55th Street • Cleveland, OH 44103
(216) 361-9995 • Fax: (216) 361-0030

variant microsystems
...Where Quality Counts

BAR CODE AND MAGNETIC CARD ACCEPTED SIMULTANEOUSLY

- For XT/AT, PS/2, 286/386/486 PCs, RS-232/Scancode terminals
- DOS/UNIX/PC-MOS compatible
- 10 year warranty on readers
- 30 day moneyback guarantee

Made in USA

CCD with Decoder & Bar Code Printing Software - $485

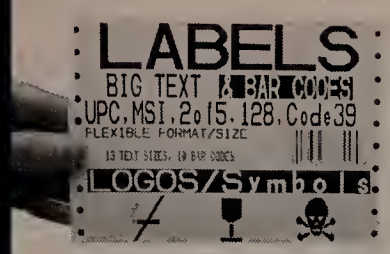
46560 Fremont Blvd., #206
Fremont, CA 94538
(510)440-2870 • (510)623-1372 (FAX)
(800)666-4BAR (Orders)

MasterCard VISA AMERICAN EXPRESS

CIRCLE 468 ON READER SERVICE CARD

WORTHINGTON DATA SOLUTIONS — BAR CODE HEADQUARTERS
OFFICES IN USA AND EUROPE

QUALITY • SERVICE • 800 SUPPORT

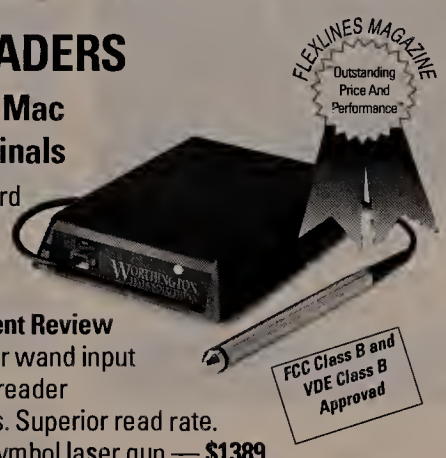


LABELING SOFTWARE

- For Epson, Oki, IBM, and LaserJet.
- Flexible design. Any Format or size.
- On-Screen Label Design, WYSIWYG.
- 16 text sizes — 3" reads at 100'
- Bar codes: 2of5, 128, UPC/EAN. AIAG, MIL-STD, ZIP+4, and Code 39
- Auto-incrementing. File input. Logos, symbols — from your scanner.
- Reversals, color, soft fonts. Powerful, Versatile, Fast, Easy!
- Rotatable, shadable, scalable fonts from .1" to 13" on Laserjet III
- Above label printed with LabelRIGHT™ — **$279**
- Sato, Zebra & Prodigy version — LabelRIGHT Thermal — **$479**
- Other menu driven programs from **$129**. SCO/UNIX — **$199**

BAR CODE READERS

for PC, XT, AT, PS/2, Mac and all RS-232 Terminals



- Attaches as 2nd keyboard
- No software changes
- 2of5, UPC/EAN, 128, Codabar, MSI, Code 39
- **Top Rated by Independent Review**
- Magstripe, laser, CCD, or wand input
- 1 or 2 input devices per reader
- 100 configurable options. Superior read rate.
- Complete with PSC or Symbol laser gun — **$1389**
- Complete with steel wand — **$399**

PORTABLE READERS

- Battery operated. Simple, Flexible, Powerful!
- 64K – 256K memory. Bar code or key input
- Big Rubber Keys. Date/Time Stamping
- Operates as Portable, Wedge, or Terminal
- Built-in Generator for Easy Programming
- 2 Built-in Inventory Programs or 3 User Written
- Upload Programs Furnished or use Xmodem
- 3 Data Files — 3 Tables for Verification
- Wand, CCD or Laser input
- Complete 64K units with wand — **$799**

Same Day Shipping! • Made in the USA • 2 Year Warranty on Wand and Decoder

European Office:
Rütistrasse 6
9050 Appenzell, Switzerland
71 87 51 15 • 71 87 51 17 Fax

USA Headquarters:
3004 Mission Street, Suite 220
Santa Cruz, CA 95060
408-458-9938 • 408-458-9964 Fax

In Europe, Call Information for Toll-Free Number to Swiss Office

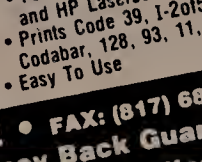
Worthington Data USA or Canada
800-345-4220
30 Day Money Back Guarantee!

BAR CODE READERS
AMERICAN MICROSYSTEMS
2190 A Regal Pkwy. • Euless, Texas 76040 • (817) 571-9015

VISA AM EX MasterCard

FOR PC, XT, AT, PS/2 & TERMINALS:

- No software changes required
- Data appears as keyboard input
- Reads Code 39, I-2of5, UPC/EAN, Codabar, 128, 93, 11, MSI/Plessey
- Auto-discriminates between codes
- Accepts WAND, SLDT, CCD, LASER, MAG STRIPE



BAR CODE PRINTING SOFTWARE:

- For Epson, OKI, IBM, Dot Matrix and HP LaserJet Printers.
- Prints Code 39, I-2of5, UPC/EAN, Codabar, 128, 93, 11, MSI/Plessey
- Easy To Use

(800) 648-4452 • FAX: (817) 685-6232
30 Day Money Back Guarantee
One Year Warranty

COMPUTER INSURANCE

SAFEWARE

Insures your computer. Full replacement of hardware, media & purchased software. As low as $49 yearly. Covers fire, power surge, and accidental damage. Now available in Ontario Province, Canada! Call for immediate coverage or information

1-800-848-3469

SAFEWARE The Insurance Agency Inc
2929 N. High St., PO Box 02211
Columbus, OH 43202
Local (614) 262-0559

DISKS

FORMATTED DISKETTES BASF, VERBATIM, SONY

WITH FORMAT	QTY 250 MIX & MATCH	WITHOUT FORMAT
$.38	5.25" DS/DD	**$.33**
$.52	5.25" DS/HD	**$.42**
$.59	3.50" DS/DD	**$.49**
$.89	3.50" DS/HD	**$.79**

- **FREE FORMATTING** on First Order
- **TYVEC SLEEVES** Included (5.25")
- **COLORED MEDIA** Please Add $.05
- **VOLUME DISCOUNTS** Available
- **SAME DAY** Shipping
- **MONEY BACK GUARANTEE**

800-255-3142
Diversified Systems Group, Inc.
PO Box 1114, Issaquah WA 98027

CIRCLE 448 ON READER SERVICE CARD

FACT: Each PC WORLD subscriber influenced software purchases of $19,587 in 1991 alone.

DATA/DISK CONVERSION

CONVERTING YOUR DISKETTES?

ENTRUST THEM TO US
2500 Word Processor & Computer formats 3½", 5¼", 8" DISKS, 3480, 8mm, TK50, CARTRIDGES, MAGTAPES, MAGCARDS, CASSETTES,

DISK DUPLICATION
OCR SCANNING SERVICES
Customized conversions too! Call us for quality, best prices and quickest turnaround time

COMPANY COMPENDIA, INC.
(800) 374-DISK
or (312) 419-8771 FAX: (312) 419-1390

CIRCLE 490 ON READER SERVICE CARD

DATA CONVERSION

If you want the most complete conversion services in the industry, just call...

(800) CONVERT

Capabilities include over 4000 formats

PIVAR COMPUTING SERVICES, inc.®
165 Arlington Heights Rd. #W
Buffalo Grove, IL 60089
(708) 459-6010

FACT: 23% *of PC WORLD's subscribers purchased PC* ***software*** *from mail-order companies last year.*

SCANNING
CONVERSION
DUPLICATION
(708) 858-4566
(800) 860-1033

- Data Entry
- Custom Programming
- Data Management
- Bar Code Conversion
- CD ROM Development

Free Tests and Quotations 24 Hour Turn-Time

Media Conversion
will scan any font or typestyle, convert any disk or tape and make duplicates any size or quantity

MEDIA CONVERSION.com
Chicago and Glen Ellyn Locations

CIRCLE 515 ON READER SERVICE CARD

DISK COPY SERVICE

MIRROR IMAGES
DISKETTE DUPLICATION
Superior duplication . . .
Your reputation depends on it.
Our reputation assures you of it.

- ALL DISK FORMATS
- FAST 24 HOUR TURNAROUND
- EXCEPTIONAL PRICING AND SERVICE

Call for more information and quotation.
800-322-0577
BOWLING GREEN, OHIO

DUPLICATION FROM $.49
HIGHEST QUALITY MEDIA

MSDOS duplication from **$.49** (5.25") and **$.80** (3.5"). Prices go even lower as you continue to order!

- Duplication + 100% Verification
- Custom Labels/Sleeves/Mailers
- Custom Packaging & Assembly
- Colored Media Available
- Special Rates For Demo Software & Site Licensing
- Educational Discounts Available
- 24 Hour Turn-Around
- Guaranteed Products

800-255-3142
Diversified Systems Group, Inc.
PO Box 1114, Issaquah WA 98027

CIRCLE 422 ON READER SERVICE CARD

Software Production

- **Full packaging services**
- **Duplication, all formats**
- **EVERLOCK copy protection**
- **Label and sleeve printing**
- **48 hour turn around**
- **Fulfillment and drop shipment**
- **Consultation and guidance**

Star-Byte, Inc.
2880 Bergey Rd., Hatfield, PA 19440
800-243-1515

CIRCLE 477 ON READER SERVICE CARD

SUPPLIES

TONER
LASER QuipT®
10300 Bren Road East
Minnetonka, MN 55343

Remanufactured cartridges for HP, Apple, etc. Exchange Price
$36.50
VISA **800-777-8444** MC, COD

CIRCLE 429 ON READER SERVICE CARD

TONER RECHARGE

Quality Toner Cartridges

- New • Remanufactured • Recycled
- Apple, Canon, HP, IBM, etc.
- Prices Starting At $25
- We Buy Empties – Call

SAVE THE EARTH

Quality Recharge Co.
105 Loughborough
St. Louis, MO 63111

FREE BROCHURE
1-800-238-2333

CIRCLE 404 ON READER SERVICE CARD

PC WORLD *DELIVERS THE BUYERS YOU NEED TO REACH!*

Study after study has proven that managers proficient with PCs now control the business PC buying process. Make sure your advertising gets maximum exposure in your best target market.

Software

BUSINESS APPLICATIONS

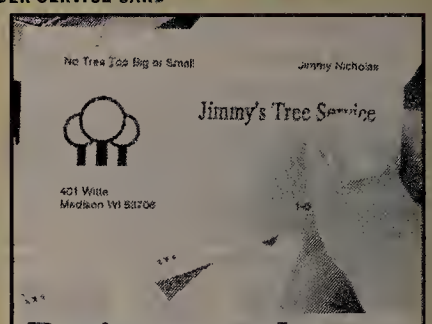
J-Track Time & Material Billing

Software for the professional. Multi user/network ready. Tracks time & materials for jobs/contracts. Includes scheduling. Integrates with Accounting software developed by American Business Systems Inc. Call today for your free demo. **Synergistic Systems Inc. 375 Morgan Lane #101, West Haven, CT 06516 800-466-7981, Fax 203-937-5451.**

CIRCLE 414 ON READER SERVICE CARD

UPS Shipping Software
Direct interface to Macola, DacEasy, RealWorld, Great Plains and Platinum. Used as TSR can work with almost any software. Also works great stand-alone. Computes zone & charges. Prints Manifests, COD tags, shipping labels, etc. Optional 100WT, GSV, RPS, USPS, FedEx, scale intf. Only $249, network $449. Gtd UPS acceptance. 60-Day money back. Free trial offer.
V-Technologies
P.O. Box 6261
Wolcott, CT 06716
(203) 879-6960
Fax (203) 879-6962

If You Ship UPS—Stop handwriting addresses in your Log Book.
Use our UPS accepted, full featured UPS Manifest System, PSP-The Parcel Shipping Program. Prints manifests, shipping labels, CODs. Try (before you buy) for only $15. If you decide to use PSP send us an additional $110. Credit Cards accepted.
East Hampton Industries
81 Newtown Lane
East Hampton, NY, 11937
800-645-1183, (516) 324-2224,
Fax (516) 324-2248



Business cards instantly and easily.

CardsNOW for the IBM and laser printer- make professional looking business cards easily in just five minutes.
Never run out of cards again.
New employees can make calls immediately.
Eliminates waiting and minimum orders.
Package comes complete with 25 art cuts, ten fonts and extra smooth edge card stock for 250 cards. Additional art cuts and card stock available.

$39

We accept Mastercard, VISA and American Express.

To order CardsNOW call: 800-233-9767.

cards·NOW™
4200 University Avenue
Madison, WI 53705-2159

MPCWD9306 © 1993, Topitzes & Associates, Inc.

CIRCLE 421 ON READER SERVICE CARD

CHURCH

Church Partner

Written by Computer professionals involved in church management. Skilled users love its power, depth and flexibility. Novices love its ease of use. 13 optional modules with support and upgrade. For IBM compatible and LANs. Object oriented graphic user interface, pop-up menus, windows mouse compatibility and more.

Software by Summit Systems Inc.
Suite 121, 16 Berry Hill Road
Columbia, SC 29210 USA
803/798-9749, 800/228-5857
Fax: 803/731-0349

Church Management Systems

Expect the best!

- *Outstanding Reporting*
- *Superior Support*
- *Integrated Modules*
- *Over 1500 Users*
- *Free Preview Disk*

1-800-247-8044

TSL - 3300 Bass Lake Road, -#304
Brooklyn Center, MN 55429
FAX 612-566-2250

CIRCLE 415 ON READER SERVICE CARD

CHURCH SOFTWARE

Discover for yourself why more churches are choosing **Power Church Plus.®**
Try out the leading membership and accounting package.
Call today for your **FREE** full-working **DEMO.**

F1 SOFTWARE, 208 Ridgefield Drive, Asheville, NC 28806
800/486-1800

CIRCLE 482 ON READER SERVICE CARD

DATA ENTRY

Viking Data Entry

Professional Quality Software
- Used by U. S. Census
- Advanced Validation
- Sequential/ISAM files
- MS/DOS, UNIX, XENIX, VMS, AIX
- Technical Support
- Re-key verify

Viking Software Services
4808 E. 67th St. Ste. 100
Tulsa, OK 74136
918/491-6144 FAX: 918/494-2701
800/324-0595

Replace dedicated *data input* systems
Front-end mainframe applications

KeyEntry III®

- ❑ LAN or stand-alone environments
- ❑ ScreenPainter and MenuManager included
- ❑ Batch Control System and Reformat utility
- ❑ Spanish, German, and French versions
- ❑ Outstanding customer support
- ❑ Thousands of users worldwide
- ❑ OS/2 version

800-533-6879

FREE DEMO DISK AVAILABLE TO QUALIFIED COMPANIES!

SCS
SOUTHERN COMPUTER SYSTEMS, INC.
(205) 251-2985 ■ FAX (205) 322-4851
In UK: SCS Europe, Ltd 0753-36550/ FAX 0753 36765

THE DATA ENTRY EMULATOR™

Full featured, heads-down entry, with two-pass verification, batch control, output record reformat, operator stats, edit language, customizable menus, help text. Free technical support.

PC from $395
Also for LAN's, IBM AS/400™, IBM S/36

FREE trial

206/776-6443
800/356-0203

COMPUTER KEYES
21929 Makoh Rd.
Woodway, WA 98020

Advertising Age Reports:

PC WORLD's *ad sales jumped 23.3% during last year's "recession".*

Why? Because products sell when advertising in these pages. Every issue, every day, in good years and bad, PC WORLD *works.*

Contact Catalog sales today: 800/262-9885

EDUCATIONAL

B.S. & M.S.
In Computer Science

- ALL COURSES HOME STUDY
- Approved for tuition reimbursement by leading corporations
- Increase your earning power
- Join students from leading computer companies
- C++ and Ada courses available.

For free information call
1-800-767-AICS

AMERICAN INSTITUTE FOR COMPUTER SCIENCES

LEARN COMPUTERS!

Home study. Become an expert personal computer user for career advancement and personal enjoyment.

Learn at your own pace. Exciting and easy to follow. **Send or call now for free career literature.**

CALL TODAY: 800-223-4542

Name_____
Address_____
City_____ State____ Zip_____

SCHOOL OF COMPUTER TRAINING
2245 Perimeter Park
Dept. KG684, Atlanta, Georgia 30341

CIRCLE 451 ON READER SERVICE CARD

FINANCIAL

Loan-Amortization

EXEC-AMORT. Replace Desktop Financial Calculators, Avoid Inaccuracies, Quit Using Your Spreadsheet, Store Loans to Disk, Solve for PV, FV, I, PMT, N. Easy to read amortization reports, fixed & ARM's, APR's per Reg Z, Points & Fees, Balloons, irregular & skipped payments. $149.95 US + $5 s/h. Int'l add $25

ELECTROSONICS
36380 Garfield, Suite 1
Fraser, MI 48026 USA
800-858-8448, 313-791-3010 fax
Int'l phone: 313-791-0770

FORTRAN

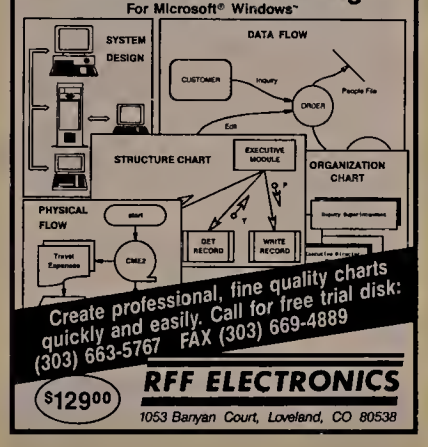
Fortran Compilers

Whether you are developing new code or moving large mainframe programs to the PC, we have the Fortran Language Systems to meet your needs. Winners of PC Magazine's Editor's Choice and Technical Excellence Awards.

LAHEY COMPUTER SYSTEMS
Box 6091
Incline Village, NV 89450
800-548-4778 or 702-831-2500
FAX: 702-831-8123

FLOW CHARTING

RFFlow
Professional Flowcharting
For Microsoft® Windows™



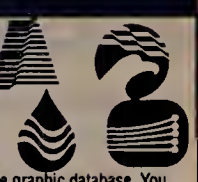
Create professional, fine quality charts quickly and easily. Call for free trial disk: (303) 663-5767 FAX (303) 669-4889

$129.00

RFF ELECTRONICS
1053 Banyan Court, Loveland, CO 80538

GRAPHICS

Logo Design Software



Logo SuperPower™ is a large graphic database. You use one or more "design elements" and modify them to create world-class logos in minutes. There are **over 2,000 logo design elements**, AI.EPS format.

SuperPower 660 (660+ design elements).....$119
Upgrade 500 (500 new design elements).....$99
Upgrade 450 (450 more new elements).....$89
Upgrade 400 (400 more new elements).....$79

Buy any module, or buy them all for just $278.00.
(Buy 1 now - buy rest in 30 days - get all for $279)
For the PC: Requires Corel Draw, A&L; Micrografx, Illustrator, Freehand or similar program.

To order, or for information, call
(800) 648-5646
Decathlon Corp. • 4100 Executive Park Dr.
Cincinnati, OH 45241
Phone (513) 421-1938

CIRCLE 417 ON READER SERVICE CARD

INVENTORY CONTROL/MANAGEMENT

RETAIL POINT OF SALE INVENTORY

Need Inventory Control??
Tired of doing things the hard way?
The POS has invoicing, reorder reports, on line stock search and browse, inventory updating, purchase orders
Supports cash drawer, tape receipt printer, pen & laser barcode scanners
Accounts Receivables, Mailing List, Barcode Printing, General Ledger, Accounts Payables, UPS programs
Prices $289 - $489 - Network versions available
Easy to learn and use - Free technical support

Freeman Software Garland, Texas
800-426-6598 334 Fieldside Dr. 214-270-0625

Retail Point of Sale
****
Inventory Programs for
Mail order
Wholesalers
Auto Parts
Tire Dealer
Package stores
Office supply

CIRCLE 518 ON READER SERVICE CARD

MEDICAL

Medical Systems with ECS

PPM offers a complt. line of med SW from simple ins. claims proc. to A/R mgt.
PC CLAIMS PLUS- claims proc. w/ECS to 100+ major ins. carriers - 30 day MB guar
THRESHHOLD- complete A/R, Pt. Bill, Comprh. practice mgt stats.
CLAIM NET- Nationwide elctrnc claims clearinghse transmits to 100+ ins. carriers. SW starts at $649. Dealer inquiries welcome
Physicians Practice Management
350 E. New York
Indianapolis, IN 46204
800/428-3515, 317/634-8080

Medical Billing Made Easy

Medsoft can handle your office NOW, and GROW with your practice. Over 1500 installations and 10 years experience means we are the experts.
Medsoft's FoxPro Sierra Line offers:
- Custom versions: MEDICAL, DENTAL, ANESTHESIA, CLINICAL
- Flexible - Used by All specialties
- Automatically Generates Insurance
- Electronic Claims
- COMPETITIVELY PRICED

FREE Demo Disk. Dealers Welcome! Source code available.
Pacific Medsoft, Inc
P.O. Box 7049 (925 N. Lake Blvd, Suite B-301) Tahoe City, CA 96145-7049
800/343-5653, 916/583-2994,
Fax 916/583-1532

MUSIC

Don't buy *any* PC MIDI products before trying the full-line from the ***industry leader***. It's a risk-free way to learn about PC music. Apply the cost if you buy software from us.
Voyetra Dept. PCD, 333 5th Ave Pelham, New York 10803 (914) 738-4500 Fax: (914) 738-6946
Orders/Free Catalog: 1-800-233-9377

CIRCLE 514 ON READER SERVICE CARD

SongWright V

MUSIC PROCESSOR prints professional sheet music, songs, scores with text, chords, dynamics. Compose, edit, record, play, transcribe, copy, transpose, extract import, publish - all in standard notation. Symbol editor/librarian. PC, MIDI/AdLib, or SMF entry & playback. Matrix/laser/Deskjet printers.
$119.95+$5 s/h. Free sample output. SONGWRIGHT SOFTWARE
7 Loudoun Street, S.E. Ste 5B
Leesburg, VA 22075
1-800-877-8070, 703-777-7232j2

MAILING PROGRAMS

The Mail Order Wizard

Complete management system for a catalog, inbound telemarketing, or mail order company. Order processing, inventory mgt, ad forecasting, sales/banking, list mgt, modem charge approval, EDC, UPS manifest w/scale interface. Single and Multi User Systems. Inbound/Outbound Editor's choice.
Haven Corporation
802 Madison Street, Dept. W593
Evanston, IL 60202
800/782-8278, 708/869-3434

The "Mail Order Master"

Software Program contains all the routines you need to run your Home or Office mail order business. Easy to use features include Powerful Database, Invoicing, Inventory Control, UPS Manifesting, Sales & Income Report, Sales Tax Report, Product Sales & Profit Report, Statements, Credit Card Voucher Printout, Bulk Mail Sort, plus lots more. IBM compatible. Single User System. Hands-On Demo $20.00.
The Marshall Weiner Corp.
1700 Catalina Ave.
Seal Beach, CA 90740
800/874-4656 USA & Canada

MAIL ORDER

Mail Order Manager (M.O.M.)™

America's most popular, complete, and affordable solution for the mail order business - order entry/review, credit card processing with draft capture, UPS manifesting, profit analysis, accounting, telemarketing, list management. Clipper compiled, dBase III + files. Single and Multi-user versions. Find out why more people buy MOM after comparing! Call for demo kit.
Dydacomp Development Corporation
150 River Road, Suite N1, Dept. PCW
Montville, NJ 07045
(800)858-DMOM (201) 335-1256

MAINTENANCE MANAGEMENT

Maintenance & Inspection

An integrated maintenance management system, including parts inventory, with clients in Fortune 500 companies, utilities, hospitals, schools, manufacturing & service industries, etc. The online system provides operational, planning & analytical reports, such as work orders, schedules, skill & inventory requirements, budget reports & reports that summarize history of work performed.
Penguin Computer Consultants
PO Box 20485
San Jose, CA 95160
408/997-7703; FAX: 408/927-0570
800/521-0545

ONLINE SERVICE

Where Adults Come To Play!

ODYSSEY BBS
Join The Thousands Of Ladies And Gents Around The World Who Have Discovered America's Leader In Online Adult Entertainment Where YOU Create The Fun! And It's Only On Odyssey!
For Modem Info, Signup Or A Local Number From Over 850 Cities Call: **818 358-6968**

CIRCLE 411 ON READER SERVICE CARD

PUBLIC DOMAIN/ SHAREWARE

FREE SOFTWARE

KIDS • FONTS • GAMES
CLIP ART • WINDOWS
HOME and BUSINESS

On 3/3.5" or 5/5.25" disks. Pay a service charge of $2.95 per collection. Credit card only.

Software of the Month Club
Satisfaction Guaranteed Since 1985
619-931-8111 Ext 511

CIRCLE 412 ON READER SERVICE CARD

The SOFTWARE LABS

WORLD'S LARGEST SHAREWARE DISTRIBUTOR
LABORATORY CERTIFIED VIRUS FREE 100% GUARANTEED
Selected by IBM as a supplier for software testing.
See why IBM chose our professionally tested virus-free library.
CALL TOLL FREE OR WRITE FOR OUR FAMOUS 80-PAGE CATALOG WITH EXCLUSIVE 12 BONUS DISK OFFER.
100 CORPORATE POINTE, SUITE 195 CULVER CITY, CA 90230
800-569-7900
FAX: 310-410-2044

CIRCLE 402 ON READER SERVICE CARD

S2O2O SOFTWARE TWENTY TWENTY

UNLIMITED FREE DISKS
OUTSTANDING SOFTWARE YOU CAN ROAD TEST AT NO CHARGE !
MATH TUTOR FONTS GENEALOGY
CHILDRENS EDUCATION CLIP ART
LOTUS 123 CLONE PC-FILE V6.5
DOS TUTORS STOCK CHARTING
SCREEN SAVERS FLOWCHARTER
GAMES WINDOWS AUTOMENU
PC-WRITE PC-KEY DRAW SOLVEIT
WORDPERFECT TUTORS UTILITIES
FREE TECHNICAL SUPPORT
UNCONDITIONAL MONEY BACK GUARANTEE
PRICED AS LOW AS $1.99 PER DISK
1-800-800-3122

CIRCLE 500 ON READER SERVICE CARD

99¢ SHAREWARE SPECTACULAR

FREE CATALOG
OVER 600 PROGRAMS
NO Minimums, NO Gimmicks, NO Clubs
Business, Windows, Games, Education
24-Hour, Toll Free Ordering
SHAREWARE EXPLOSION CD-ROM – $49
Over 5,000 Programs – Menu Driven
We Carry a Full Line of Graphics CD-ROMS
S Software, 2880 Bergey Rd., Dept 600BM
Hatfield, PA 19440 • (215) 997-2470

CIRCLE 405 ON READER SERVICE CARD

FREE IBM & MAC SOFTWARE CATALOG

32 Pages! ASP Member

SOFTSHOPPE, INC.
P.O. Box 247
ARTESIA, CA 90701
Tel: (714) 261-0114
FAX: (310) 802-1494

Toll-Free—24 Hrs.
1-800-851-8089

CIRCLE 512 ON READER SERVICE CARD

POINT OF SALE

RoundTable Restaurant

POINT-OF-SALE SOFTWARE. Improves Profits & Communications; Quick to Install & Learn. Runs on any compatible PC or Motorola 8120 RISC UNIX server. Reseller inquiries welcomed. $495/base copy $295/ea. addt'l NW copy; 30-day Money Back Guarantee. Working Demo Disk available $20.
ADVANTA Technologies
One West Loop South, Suite 801
Houston, TX 77027
(800) 324-2388

REAL ESTATE

Property Management

Rental-Ease. Tracks tenants, income and expense, repairs and maintenance and much more. Guaranteed to be the easiest and fastest property management program available at any price. Others claim ease of use, see our demo and decide for yourself.
Versions for owners, professionals, networks. $395 to $1295. Free brochure, demo $10
Strategic Office Systems
688 North 500 West #61
Mt. Pleasant, UT 84647
800/942-6784 or 801/462-2130

Property Management

Comprehensive software for managing residential, commercial, condos & more. Three versions: Basic PM for owner/manager-$495, Deluxe PM for professional management-$1,195, Multi-User with Novell network compatibility-$2,395. Includes check writing, recurring expenses, G/L, management reporting.
Yardi Systems, Inc.
819 Reddick Street
Santa Barbara, CA 93103
805/966-3666

SURVEYS

NEW StatPac Gold IV

Professional's choice for survey & marketing research. Covers questionnaire design, sampling, CRT & telephone interviewing, basic analyses & presentation quality graphics. Includes frequencies, tabs, banners, descriptives, t-tests, verbatim coding, etc. Advanced statistics available. Free brochure.
StatPac Inc.
3814 Lyndale Ave. S., Mpls., MN 55409
Tel: (612) 822-8252

The Survey System

Analyzes: marketing, public opinion, customer satisfaction, employee attitude surveys. Handles mail, personal, phone, scanner, disk-by-mail or computer interviews. Records verbatim text and actual voice answers. Graphics, network version, user friendly. Free support.
Creative Research Systems
15 Lone Oak Ctr., Dept W
Petaluma, CA 94952
Ph (707)765-1001 Fax (707)765-1068

SECURITY

FIGHT PIRACY PROTECT YOUR SOFTWARE

Since 1986 thousands of companies worldwide have chosen Az-Tech Software as partners in their fight against Software Pirates. Why? Because Az-Tech offers you:

EVERLOCK 3.0

- *OPTION BOARD SAFE*
- *CPU LOCK*
- *REMOTE REGISTRATION*
- *CD ROM LOCK*
- *WINDOWS COMPATIBLE*

EVERKEY LOCKS

Call Today For A FREE DEMO
1-800-227-0644

Az-Tech Software, Inc.
201 East Franklin
Richmond, MO 64085
(816) 776-2700 FAX (816) 776-8398

CIRCLE 403 ON READER SERVICE CARD

Electronic Privacy

PCCrypto™ enciphers any DOS file for absolute privacy by using the One Time Pad algorithm – the only unbreakable cryptosystem. Menu driven, on-line context sensitive help. Sold in sets of two. 30 day money back guar. Send $59 check/MO per set + $2 S&H (+$2.66 tax in VA). Or write for more info!
DataSafe Computing, Dept B
P.O. Box 22508
Alexandria, VA 22304-9998

FACT: ADD RED AS A SECOND COLOR. INCREASE RESPONSE BY 41%.

UTILITIES

REMOVE HARDWARE LOCKS

Protect your investment!

Don't wait for your lock to get lost, stolen or fail and render your program useless costing you $$$$

Our SAFEKEY'S are guaranteed to unlock the following programs:

MaxRoute	Pads 2000	3D-Studio
MasterCam	CadKey	Topas
MicroStation	Rio	& others

From $399 plus S&H
(609) 390-2799
VISA Fax: (609) 390-3750 MasterCard

IMAGINE THAT
One Evergreen, Seaville, NJ 08230

CIRCLE 486 ON READER SERVICE CARD

SCHOOL APPLICATIONS

School Partner

FACT: THIS SYSTEM COSTS A FRACTION OF LESSER SYSTEMS, and DOES MORE!
OUR SYSTEM CAPABILITIES INCLUDE:
- Teacher & Student Medical Records
- Classes, Rosters, Attendance
- Billing & Receivables
- General Ledger, Payables, Payroll
- And More

FOR: IBM Compatibles and Networks
We offer ongoing Technical Support, and openly share ideas.
Summit Systems, Inc.
16 Berry Hill Rd, #121
Columbia, SC 29210 USA
Fax 803-731-0349
Phone 800-228-5957 803-798-9749

WHAT'S UP AT PC WORLD?

CIRCULATION

√ Rate Base 901,000 – an increase of 281,000

√ Newsstand up 28%

READER RESPONSE

√ Over 1,000,000 Reader responses to ads in PC WORLD last year.

EDITORIAL PAGES

√ More editorial pages covering more products for managers.

√ Focused on manager's needs: how to plan, buy and use.

ADVERTISING PAGES

√ Up 12% year-to-date.

√ More advertisers are investing more ad pages in PC WORLD than ever before.

MORE MANAGERS THAN EVER

√ 74% of subscribers are managers proficient with PCs.

√ 646,000 unduplicated management readers.

MULTIMEDIA REVEALED

INTRODUCING A NEW INTERACTIVE CD...

THE GUIDED TOUR OF MULTIMEDIA

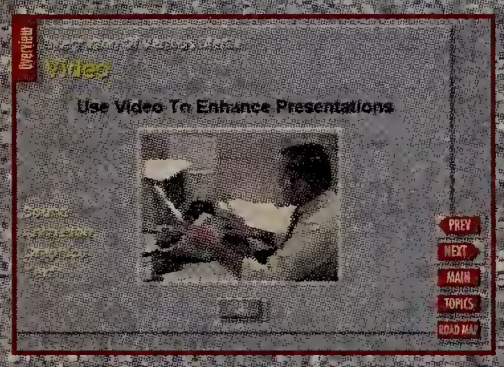
Experience the exciting world of Multimedia at your own pace. Its power, capabilities, and potential. The Guided Tour of Multimedia lets you interactively explore:

- The Technical Fundamentals of Multimedia
- Hardware/Software Needs and Capabilities
- How to Create Multimedia Presentations
- Vast Clip Libraries of Graphics, Sound, Video
- Interactive Table of Contents, Glossary, Index

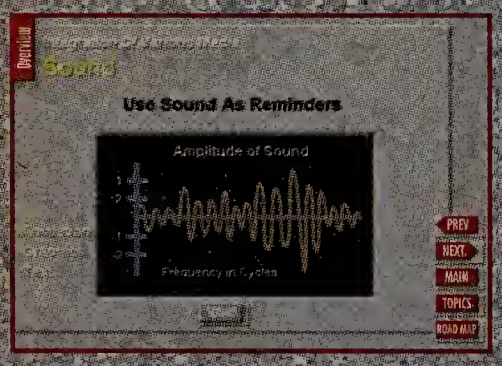
Minimum System Configuration:

- PC 386SX or better
- Windows 3.1 or 3.0 w/Extensions
- 2 MB RAM, 4 MB recommended
- 30 MB hard disk
- VGA display, 256 colors
- CD–ROM Drive
- Sound board (optional)

PC Multimedia



VIDEO Capture/playback video



SOUND Add music & voice-over

ANIMATION makes your work fly

The Guided Tour of Multimedia is a complete interactive resource for both beginners and professionals. This powerful CD, which has over 20 hours of content, has been compiled and developed by a team of world-renowned experts in the field –

MULTIMEDIA WORLD

Zone Publishing

The Guided Tour of Multimedia comes complete with the Multimedia Roadmap book, which contains many valuable discount coupons where you can save hundreds of dollars on multimedia products from such leading manufacturers as–

ASYMETRIX, CALCOMP, COMPTON'S NEWMEDIA, GOLD DISK, IBM, IDG/ETA, MACROMEDIA, MEDIA VISION, MICROTEK, SONY

To experience all the wonders of Multimedia, call 1-800-942-4000
This exciting product is available for $49.95 plus applicable taxes and $3.50 for shipping and handling.
Please have your VISA or MasterCard ready when you call, or send your check or money order to:

The Guided Tour of Multimedia
914 S. Hoover St., Los Angeles, CA 90006

PC WORLD

PUBLISHER Richard J. Marino
Assistant to the Publisher Colette Cornish

ADVERTISING SALES

Senior Vice President, National Accounts Director
Bernard J. Theobald, Jr.

Assistant to the Senior Vice President
Patricia Owen

Vice President, Director of Advertising
Jeff Edman

Assistant to the Director of Advertising
Kate Comfort Harr

EAST

Eastern Advertising Director
Bob Ostrow (508/820-0440)

Administrative Assistant
Ellen Sanderson

Mid-Atlantic/Manhattan
John Grogan, Senior Account Manager (201/587-0090)

New England/Ohio/Michigan/Eastern Canada
Michael Welsh Carroll, Account Manager (508/820-0440)

Southeast/Pennsylvania
Judy Sutter, Senior Account Manager (404/394-0758)

East
Michael Harwayne, Account Representative (210/587-0900)

MIDWEST

Midwest Advertising Director
Mark Taussig (708/827-4477)

Administrative Assistant
Tammy Torp

Midwest/Texas
Harvey Diamond, Senior Account Manager, National Direct Account Manager (214/233-3492)

Midwest
Duane Hampson, Account Representative (415/243-0500)

NORTHWEST

Northwestern Advertising Director
Bob Carrigan (415/243-0500)

Northern California
Corinne Cox, Account Manager (415/243-0500)

San Jose, California
Susan Simmons, Senior Account Manager, Director of Strategic Markets (415/243-0500)

SOUTHWEST

Southwestern Advertising Director
Greg Mason (415/243-0500)

Administrative Assistant
Casady Rutter

Southern California (San Diego/Orange County)
M. William Hanck, Account Manager (714/250-8081)

Southern California/Colorado/New Mexico/Utah/Idaho
Lisa Crutchfield, Account Manager (714/250-8081)

Los Angeles, California/Arizona
Neil Ferree, Account Manager (310/312-8008)

West
Sandie Wade, Account Representative (415/243-0500)

LOTUS EDITION ADVERTISING SALES
Kevin Normandeau, Account Representative (508/820-8113)

PC WORLD CATALOG
(800/262-9885)
Catalog Manager Pat Fales
Eastern Account Manager Chris Kimball
Western Account Manager Dean Lucente
Coordinator Sally Naylor

PC WORLD ACTION CARDS
Account Representatives
Kevin Normandeau (508/820-8113)
Leslie Piper (415/243-0500)

CIRCULATION, MARKETING, RESEARCH

Senior Vice President
Heather Martin Maier

Assistant to the Senior Vice President
Anna Mercaldi

Subscription Director David Ball

Senior Promotion Manager
Francesca Davies

Circulation Business Manager Noël White

Promotion Manager Ellen DiMatteo

Promotion Coordinator Jane Kratochvil

Renewal and Billing Coordinator
David Cobb

Circulation Assistant Katherine McCarthy

Subscriber Service Charles T. Powell, III

Single Copy Sales
Kemco Publishers Services (603/924-0224)

Marketing Manager Alan Abrams

Public Relations Manager Lee Doyle

Reprints Coordinator Scott Shores

Marketing Coordinator Sandy Wong

Administrative Assistant Krista Alvarez

Research Director Cheryl Curbow

Research Manager Thomas Gewecke

PRODUCTION

Vice President, Manufacturing
Linda Manes Goodwin

Senior Production Manager
Nadia Maudsley

Advertising Information Manager
Kevin Octavio

Assistant Production Manager
Kathy Badertscher

Advertising Production Coordinator
Paul O'Neil

Production Coordinator Nancy Jonathans

Advertising Information Assistant
Erin Wayman

HUMAN RESOURCES

Director, Human Resources
Richard Willoughby

Administrator, Human Resources
Thalia Ohara

Human Resources Assistant Maria Chico

ADMINISTRATION

Director of Finance Vicki Peilen

Director of Information Services
Walter J. Clegg

Corporate Business Manager
Christina Spence

Accounting/Operations Manager
Pat Murphy

Accounting/Facilities Manager
Michelle Reyes

Senior Financial Analyst
Madeleine Buckingham

Special Assistants to the President
Thomas Hsieh, Jr., Scott Laughlin

Assistant to the President Kelly Milan

Advertiser Index A-Z

Get more information—circle the appropriate number on the reader service card.

Reader Service Number		Page Number
3	Acer	186-187
66	Acma Computers, Inc.	94
9	Advanced Logic Research	11
207	America Online	251,261-262
89	Advanced Micro Devices	253
45	American Power Conversion	49
1	American Small Business Computers	218
–	Anthro Corp.	34
8	Arlington Computer Products	289
–	AST Research	26-27
5	ATI Technologies	39
95	Bay Technical Associates	22
63	Borland International	245
17	Caere Corp.	235
50	Canon	241
52	Central Point Software	112-113
53	Claris	52-53
83	Compaq	12-17
47	Compaq	167-174
14	CompuDyne	204-205
33	CompuServe	243
26	Computer Associates	219A
78	Computer Associates	219B
39	Computer Associates	219C
68	Computer Discount Warehouse	285-287
–	Computerworld	219
92	Corel Systems Corp.	257
–	Curtis	30
–	Dec Direct	207-210
–	Dell Computer Corp.	51
–	Dell Computer Corp.	146-147
–	Dell Computer Corp.	C5-C8
–	Dow Jones	219D
–	Epson	82-83
–	Epson	128-129
82	ExecuTrain	223
100	Fargo Electronics, Inc.	55
235	Fifth Generation	18
73	First Source International	292
153	Fujitsu Computer Products	264
–	Gateway 2000	57-68
–	Gateway 2000	85-88

PC World is a publication of International Data Group, the world's largest publisher of computer-related information and the leading global provider of information services on information technology. International Data Group publishes 190 computer publications in 60 countries. Thirty million people read one or more International Data Group publications each month. International Data Group's publications include: **ARGENTINA**'s Computerworld Argentina, Infoworld Argentina; **ASIA**'s Computerworld Hong Kong, Computerworld Malaysia, Computerworld Southeast Asia, PC World Hong Kong, PC World Malaysia, PC World Singapore; **AUSTRALIA**'s Australian Macworld, Australian PC World, Computerworld Australia, IDG Sources, Reseller; **AUSTRIA**'s Computerwelt Oesterreich, PC Test; **BRAZIL**'s Computerworld, Mundo IBM, Mundo Unix, PC World, Publish; **BULGARIA**'s Computerworld Bulgaria, Ediworld, PC World Bulgaria; **CANADA**'s Direct Access, Graduate Computerworld, InfoCanada, Network World Canada; **CHILE**'s Computerworld, Informática; **COLOMBIA**'s Computerworld Colombia; **CZECH REPUBLIC**'s Computerworld, Elektronika, PC World; **DENMARK**'s CAD/CAM World, Communications World, Computerworld Danmark, Computerworld Focus, Computerworld Uddannelse, Lotus World, Macintosh Produktkatalog, Macworld Danmark, PC World Danmark, PC World Produktguide, Windows World; **ECUADOR**'s PC World; **EGYPT**'s PC World Middle East; **FINLAND**'s MikroPC, Tietoverkko, Tietoviikko; **FRANCE**'s Distributique, Golden Mac, InfoPC, Languages & Systems, Le Guide du Monde Informatique, Le Monde Informatique, Télécoms & Reseaux; **GERMANY**'s Computerwoche, Computerwoche Extra, Computerwoche Focus, Computerwoche Karriere, edv aspekte, Information Management, Macwelt, Netzwelt, PC Welt, PC Woche, Publish, Unit; **HUNGARY**'s Computerworld SZT, PC World; **INDIA**'s Computers & Communications; **ISRAEL**'s Computerworld Israel, PC World Israel; **ITALY**'s Computerworld Italia, Lotus Magazine, Macworld Italia, Networking Italia, PC World Italia; **JAPAN**'s Computerworld Japan, Macworld Japan, SunWorld Japan; **KENYA**'s East African Computer News; **KOREA**'s Computerworld Korea, Macworld Korea, PC World Korea; **MEXICO**'s Compu Edicion, Compu Manufactura, Computacion/Punto de Venta, Computerworld Mexico, MacWorld, Mundo Unix, PC World, Windows; **THE NETHERLANDS**' Computerl Totaal, LAN Magazine, MacWorld; **NEW ZEALAND**'s Computer Listings, Computerworld New Zealand, New Zealand PC World; **NIGERIA**'s PC World Africa; **NORWAY**'s Computerworld Norge, C/World, IDG Direct Response, Lotusworld Norge, Macworld Norge, Networld, PC World Ekspress, PC World Norge, PC World's Product Guide, Publish World, Student Data, Unix World, Windowsworld; **PANAMA**'s PC World; **PEOPLE'S REPUBLIC OF CHINA**'s China Computerworld, Computer News Digest, Electronics International, Electronics New Product World, PC World China; **PERU**'s PC World; **PHILIPPINES**' Computerworld, PC World; **POLAND**'s Computerworld Poland, PC World/Komputer; **PORTUGAL**'s MacIn; **ROMANIA**'s Infoclub Magazine; **RUSSIA**'s Computerworld-Moscow, Mir-PC, Sety; **SLOVINIA**'s Monitor Magazine; **SOUTH AFRICA**'s Computing S.A.; **SPAIN**'s Amiga World, Autoedicion, Computerworld España, Comunicaciones World, Macworld España, NeXTworld, PC World España, Publish, Sunworld; **SWEDEN**'s Attack, ComputerSweden, Corporate Computing, DataIngenjoren, Lokala Natverk/LAN, Lotus World, MAC&PC, Macworld, Maxi Data, Mikrodatorn, PC World, Publishing & Design (CAP), Windows World; **SWITZERLAND**'s Computerworld Schweiz, Macworld Schweiz, PC & Workstation; **TAIWAN**'s Computerworld Taiwan, Global Computer Express, PC World Taiwan; **THAILAND**'s Thai Computerworld; **TURKEY**'s Computerworld Monitor, Macworld Turkiye, PC World Turkiye; **UNITED KINGDOM**'s Lotus Magazine, Macworld, Sunworld; **UNITED STATES**' AmigaWorld, Cable in the Classroom, CD Review, CIO, Computerworld, Desktop Video World, DOS Resource Guide, Electronic News, Federal Computer Week, Federal Integrator, GamePro, IDG Books, inCider/A+, Infoworld, Infoworld Direct, Laser Event, Macworld, Multimedia World, Network World, NeXTworld, PC Games, PC Letter, PC World, Publish, SunWorld, SWATPro, Video Event, Video Toaster World; **VENEZUELA**'s Computerworld Venezuela, MicroComputerworld Venezuela; **VIETNAM**'s PC World Vietnam.

Index

Reader Service Number		Page Number
–	Graphix Zone	276
179	Haventree Software Ltd.	296B
90	Helix Software	175
102	Hewlett Packard	71
–	IBM Corp.	115-118
162	IBM Personal Software Products	249
–	IDG Books	299A-299B
132	In Focus Systems	233
131	Insight Computers	200-201
107	Intel Corp.	90-91
116	Key Tronic	107
–	LA Trade	283
156	LaserMaster	298
206	LearnKey, Inc	290-291
–	Lotus	20-21
–	Lotus	40-41
–	Lotus	141-143
165	MEI/Micro Center	73
217	Memitt Computer Products	234
–	Microsoft	33,35
–	Microsoft	76-77
–	Microsoft	108-109
–	Microsoft	132-133
–	Microsoft	176-177
–	Microsoft	196-197
–	Microsoft	211
200	MicroSolutions	24
172	MIS Computer Systems	282
201	NEC Technologies	C2-P1
203	NEC Technologies	164-165
139	NISCA, Inc.	160
–	Northgate Computer Systems	182-183
176	nView Corp.	28
199	Okidata	121
222	One-Write Plus	225
–	Pacific Data Products	92
233	Patton & Patton	294
180	PC Connection	150-159
–	PC Expo	299
207	PC World Online	251,261-262
212	PKWARE	256
177	Presentation Task Force	99
198	Protec Microsystems, Inc.	38
184	QMS	227
236	Qualitas	296A
189	Quarterdeck	237
239	Rose Electronics	228
255	Sampo	229
225	Serif, Inc.	81
191	The Sierra Network	252
253	SPSS, Inc.	29
246	Sumeria	295
249	Supra Corp.	25
252	Symantec	231
124	Tektronix, Inc.	247
244	Texas Instruments	239
242	Texas Instruments	255
173	Time Solutions	125
257	Toshiba	192-193
154	U.S. Robotics, Inc.	263
148	USA Flex	284
224	Valitek	242
250	Western Telematic	232
–	WordPerfect	122-123
238	Worldwide Technologies	288
258	Zeos International	4-7
260	Zeos International	8-9

Advertiser Index by Product Category

Get more information—circle the appropriate number on the reader service card.

HARDWARE

Boards/Cards/Chips

89	Advanced Micro Devices	253
5	ATI Technologies	39

Communications/Fax/Modems

249	Supra Corp.	25
154	U.S. Robotics, Inc.	263

Computers

3	Acer	186-187
66	Acma Computers, Inc.	94
9	Advanced Logic Research	11
–	AST Research	26-27
83	Compaq	12-17
47	Compaq	167-174
14	CompuDyne	204-205
–	Dcc Direct	207-210
–	Dell Computer Corp.	146-147
–	Dell Computer Corp.	C5-C8
–	Gateway 2000	57-68
–	Gateway 2000	85-88
–	IBM Corp.	115-118
162	IBM Personal Software Products	249
131	Insight Computers	200-201
172	MIS Computer Systems	282
203	NEC Technologies	164-165
–	Northgate Computer Systems	182-183
148	USA Flex	284
258	Zeos International	4-7

Input Devices

–	Epson	82-83
116	Key Tronic	107
–	Microsoft	108-109

Laptops/Notebooks

14	CompuDyne	204-205
–	Dell Computer Corp.	51
–	Gateway 2000	85-88
165	MEI/Micro Center	73
139	NISCA, Inc.	160
–	Northgate Computer Systems	182-183
244	Texas Instruments	239
257	Toshiba	192-193
260	Zeos International	8-9

Local Area Networks

198	Protec Microsystems, Inc.	38
239	Rose Electronics	228
250	Western Telematic	232

Monitors

132	In Focus Systems	233
201	NEC Technologies	C2-P1
176	nView Corp.	28
255	Sampo	229

Peripheral/Sharing Devices

95	Bay Technical Associates	22
–	Microsoft	108-109
198	Protec Microsystems, Inc.	38
239	Rose Electronics	228
250	Western Telematic	232

Power Protection

45	American Power Conversion	49
–	Curtis	30

Printers

95	Bay Technical Associates	22
50	Canon	241
–	Epson	128-129
100	Fargo Electronics, Inc.	55
156	LaserMaster	298
199	Okidata	121
–	Pacific Data Products	92
184	QMS	227
124	Tektronix, Inc.	247
242	Texas Instruments	255

Scanners

50	Canon	241
139	NISCA, Inc.	160

Storage Devices

153	Fujitsu Computer Products	264
200	MicroSolutions	24
224	Valitek	242

Systems

–	Dell Computer Corp.	C5-C8

SOFTWARE

Accounting/Financial

222	One-Write Plus	225
173	Time Solutions	125

CAD/CAM

1	American Small Business Computers	218

Database Management

26	Computer Associates	219A
39	Computer Associates	219C
63	Borland International	245

Desktop Publishing

17	Caere Corp.	235
225	Serif, Inc.	81

Graphics

1	American Small Business Computers	218
92	Corel Systems Corp.	257

Integrated Software

53	Claris	52-53

Management

90	Helix Software	175

Multimedia

107	Intel Corp.	90-91
246	Sumeria	295

Operating Systems

–	Microsoft	33,35
189	Quarterdeck	237

Presentation Graphics

–	Lotus	40-41
–	WordPerfect	122-123

Project Management

78	Computer Associates	219B
179	Haventree Software Ltd.	296B
–	Microsoft	211
233	Patton & Patton	294

Spreadsheets

–	Lotus	20-21
–	Microsoft	76-77

Statistics

253	SPSS, Inc.	29

Utilities

52	Central Point Software	112-113
235	Fifth Generation	18
102	Hewlett Packard	71
212	PKWARE	256
236	Qualitas	296A
252	Symantec	231

Windows

–	Microsoft	132-133
177	Presentation Task Force	99
102	Hewlett Packard	71

Word Processing

–	Lotus	141-143
–	Microsoft	196-197

MISCELLANEOUS

Books/Periodicals

–	Computerworld	219
–	IDG Books	299A-299B

Computer Accessories

–	Anthro Corp.	34
8	Arlington Computer Products	289
217	Memitt Computer Products	234

Mail Order

47	Compaq	167-174
68	Computer Discount Warehouse	285-287
73	First Source International	292
–	LA Trade	283
172	MIS Computer Systems	282
180	PC Connection	150-159
148	USA Flex	284
238	Worldwide Technologies	288

FREE PRODUCT INFORMATION PC WORLD

NAME

TITLE

COMPANY

ADDRESS

CITY STATE ZIP

PHONE ( ) FAX ( )

INFORMATION FROM ADVERTISERS

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120
121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140
141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160
161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180
181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200
201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220
221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240
241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260
401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420
421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440
441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460
461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480
481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500
501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520

☐ Check this box for your subscription to *PC WORLD*. You will be billed $19.97 for a 1-year (12 issue) subscription (U.S. only).

Circle the number corresponding to the product or product category you need to know more about. Mail or fax the completed card today. Manufacturers will send product information directly to you. Fax to (413) 637-4343.

PRODUCTS FEATURED IN EDITORIAL

601	602	603	604	605	606	607	608	609	610	611	612	613	614	615	616	617	618	619	620
621	622	623	624	625	626	627	628	629	630	631	632	633	634	635	636	637	638	639	640
641	642	643	644	645	646	647	648	649	650	651	652	653	654	655	656	657	658	659	660
661	662	663	664	665	666	667	668	669	670	671	672	673	674	675	676	677	678	679	680
681	682	683	684	685	686	687	688	689	690	691	692	693	694	695	696	697	698	699	700
701	702	703	704	705	706	707	708	709	710	711	712	713	714	715	716	717	718	719	720
721	722	723	724	725	726	727	728	729	730	731	732	733	734	735	736	737	738	739	740
741	742	743	744	745	746	747	748	749	750	751	752	753	754	755	756	757	758	759	760
761	762	763	764	765	766	767	768	769	770	771	772	773	774	775	776	777	778	779	780
781	782	783	784	785	786	787	788	789	790	791	792	793	794	795	796	797	798	799	800
801	802	803	804	805	806	807	808	809	810	811	812	813	814	815	816	817	818	819	820
821	822	823	824	825	826	827	828	829	830	831	832	833	834	835	836	837	838	839	840
841	842	843	844	845	846	847	848	849	850	851	852	853	854	855	856	857	858	859	860
861	862	863	864	865	866	867	868	869	870	871	872	873	874	875	876	877	878	879	880
881	882	883	884	885	886	887	888	889	890	891	892	893	894	895	896	897	898	899	900

PRODUCT CATEGORY INFORMATION

6/93

For information on all of the products mentioned in an article or an entire category of advertised products, circle the appropriate number below.

Editorial Features (see article for numbers)

901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920

Advertised Products

951 Desktop computers
952 Notebook computers
953 DTP/Presentation software
954 Monitors and video boards
955 Accounting software
956 Draw/paint software
957 Network/sharing products
958 Printers
959 Multimedia products
960 Utilities
961 Mail order companies
962 Storage devices

June1993 This card expires October 14, 1993 L1

Free Product Information

For quicker response, fax to (413) 637-4343.

NO POSTAGE NECESSARY IF MAILED IN THE UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS MAIL PERMIT NO. 758 PITTSFIELD, MA

POSTAGE WILL BE PAID BY ADDRESSEE

PC WORLD

Product Information Center
P.O. Box 5330
Pittsfield, MA 01203-9871

FREE PRODUCT INFORMATION PC WORLD

NAME

TITLE

COMPANY

ADDRESS

CITY STATE ZIP

PHONE ( ) FAX ( )

INFORMATION FROM ADVERTISERS

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120
121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140
141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160
161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180
181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200
201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220
221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240
241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260
401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420
421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440
441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460
461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480
481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500
501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520

☐ Check this box for your subscription to *PC WORLD*. You will be billed $19.97 for a 1-year (12 issue) subscription (U.S. only).

Circle the number corresponding to the product or product category you need to know more about. Mail or fax the completed card today. Manufacturers will send product information directly to you. Fax to (413) 637-4343.

PRODUCTS FEATURED IN EDITORIAL

601	602	603	604	605	606	607	608	609	610	611	612	613	614	615	616	617	618	619	620
621	622	623	624	625	626	627	628	629	630	631	632	633	634	635	636	637	638	639	640
641	642	643	644	645	646	647	648	649	650	651	652	653	654	655	656	657	658	659	660
661	662	663	664	665	666	667	668	669	670	671	672	673	674	675	676	677	678	679	680
681	682	683	684	685	686	687	688	689	690	691	692	693	694	695	696	697	698	699	700
701	702	703	704	705	706	707	708	709	710	711	712	713	714	715	716	717	718	719	720
721	722	723	724	725	726	727	728	729	730	731	732	733	734	735	736	737	738	739	740
741	742	743	744	745	746	747	748	749	750	751	752	753	754	755	756	757	758	759	760
761	762	763	764	765	766	767	768	769	770	771	772	773	774	775	776	777	778	779	780
781	782	783	784	785	786	787	788	789	790	791	792	793	794	795	796	797	798	799	800
801	802	803	804	805	806	807	808	809	810	811	812	813	814	815	816	817	818	819	820
821	822	823	824	825	826	827	828	829	830	831	832	833	834	835	836	837	838	839	840
841	842	843	844	845	846	847	848	849	850	851	852	853	854	855	856	857	858	859	860
861	862	863	864	865	866	867	868	869	870	871	872	873	874	875	876	877	878	879	880
881	882	883	884	885	886	887	888	889	890	891	892	893	894	895	896	897	898	899	900

PRODUCT CATEGORY INFORMATION

6/93

For information on all of the products mentioned in an article or an entire category of advertised products, circle the appropriate number below.

Editorial Features (see article for numbers)

901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920

Advertised Products

951 Desktop computers
952 Notebook computers
953 DTP/Presentation software
954 Monitors and video boards
955 Accounting software
956 Draw/paint software
957 Network/sharing products
958 Printers
959 Multimedia products
960 Utilities
961 Mail order companies
962 Storage devices

June1993 This card expires October 14, 1993 L3

Free Product Information

For quicker response, fax to (413) 637-4343.

NO POSTAGE NECESSARY IF MAILED IN THE UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS MAIL PERMIT NO. 758 PITTSFIELD, MA

POSTAGE WILL BE PAID BY ADDRESSEE

PC WORLD

Product Information Center
P.O. Box 5330
Pittsfield, MA 01203-9871

FREE PRODUCT INFORMATION PC WORLD

NAME

TITLE

COMPANY

ADDRESS

CITY STATE ZIP

PHONE ( ) FAX ( )

INFORMATION FROM ADVERTISERS

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120
121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140
141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160
161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180
181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200
201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220
221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240
241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260
401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420
421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440
441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460
461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480
481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500
501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520

☐ Check this box for your subscription to *PC WORLD*. You will be billed $19.97 for a 1-year (12 issue) subscription (U.S. only).

Circle the number corresponding to the product or product category you need to know more about. Mail or fax the completed card today. Manufacturers will send product information directly to you. Fax to (413) 637-4343.

PRODUCTS FEATURED IN EDITORIAL

601	602	603	604	605	606	607	608	609	610	611	612	613	614	615	616	617	618	619	620
621	622	623	624	625	626	627	628	629	630	631	632	633	634	635	636	637	638	639	640
641	642	643	644	645	646	647	648	649	650	651	652	653	654	655	656	657	658	659	660
661	662	663	664	665	666	667	668	669	670	671	672	673	674	675	676	677	678	679	680
681	682	683	684	685	686	687	688	689	690	691	692	693	694	695	696	697	698	699	700
701	702	703	704	705	706	707	708	709	710	711	712	713	714	715	716	717	718	719	720
721	722	723	724	725	726	727	728	729	730	731	732	733	734	735	736	737	738	739	740
741	742	743	744	745	746	747	748	749	750	751	752	753	754	755	756	757	758	759	760
761	762	763	764	765	766	767	768	769	770	771	772	773	774	775	776	777	778	779	780
781	782	783	784	785	786	787	788	789	790	791	792	793	794	795	796	797	798	799	800
801	802	803	804	805	806	807	808	809	810	811	812	813	814	815	816	817	818	819	820
821	822	823	824	825	826	827	828	829	830	831	832	833	834	835	836	837	838	839	840
841	842	843	844	845	846	847	848	849	850	851	852	853	854	855	856	857	858	859	860
861	862	863	864	865	866	867	868	869	870	871	872	873	874	875	876	877	878	879	880
881	882	883	884	885	886	887	888	889	890	891	892	893	894	895	896	897	898	899	900

PRODUCT CATEGORY INFORMATION 6/93

For information an all af the products mentioned in on article or an entire category af advertised products, circle the appropriate number below.

Editorial Features (see article for numbers)

901	902	903	904	905	906	907	908	909	910	911	912	913	914	915	916	917	918	919	920

Advertised Products

951 Desktop computers
952 Notebook computers
953 DTP/Presentotion softwore
954 Monitors ond video boards
955 Accounting softwore
956 Draw/paint saftware
957 Network/shoring products
958 Printers
959 Multimedio products
960 Utilities
961 Moil order companies
962 Storage devices

June1993 This card expires October 14, 1993 L2

Free Product Information

For quicker response, fax to (413) 637-4343.

NO POSTAGE NECESSARY IF MAILED IN THE UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS MAIL PERMIT NO. 758 PITTSFIELD, MA

POSTAGE WILL BE PAID BY ADDRESSEE

PC WORLD

Product Information Center
P.O. Box 5330
Pittsfield, MA 01203-9871

Index

Reader Service Number — Page Number

Online Services

207 America Online 251,261-262
33 CompuServe 243
– Dow Jones 219D
207 PC World Online 251,261-262
191 The Sierra Network 252

Services

– Microsoft 176-177

Trade Shows

– Graphix Zone 276
– PC Expo 299

Training

82 ExecuTrain 223
206 LearnKey, Inc 290-291

Products Featured in Editorial

Get more information—circle the appropriate number on the reader service card.

Add-On Board

662 Diamond Stealth Pro VLB, Viper VLB; Diamond Computer Systems 89
626 FastCache 64, Corporate Systems Center 216
655 Kingston DataCard, Kingston Technology 84
664 Matrox MGA Impression Boards, Matrox 89
625 Model S425I, Alpha Research ... 216
627 QuickCache, WinStore; Perceptive Solutions 216
628 Ultra 15C, UltraStor 216

Backup Software

656 Flexibak Plus, Dysan Int'l 84

CD ROM

643 RCD-202, RCD-200; Pinnacle Micro 70

Computer System

715 486/SX Dual Scan Color LeaderBook Pro, PC Brand 293
670 Acma 486SX-33 VESA, Acma ... 105
671 ALR Flyer SD 4/25s Model 80DW, ALR 105
672 AST Bravo 4/25s, AST Research 105
673 ATronics ATI-486SX/33, ATronics Int'l 106
674 ATS 486-33, ATS Computers 106
675 Auva 486DX/50 Model S10, Auva 106
676 Blackship BLK 486DX/33 LB, Blackship Computer Systems 110
677 CAF Gold 3D, CAF Technology 110
642 CompuAdd 450SLC2, CompuAdd Computer 70
640 Contenda, Zeos Int'l 69
678 CUI Advantage 486/25SX, CUI 110
679 Dell 425s/L, Dell 111
680 Diamond DT 486DLC/40, Diamond Technologies 111
681 First Computer FCS 486SX-33, First Computer 114
682 Gateway 2000 4SX-25, Gateway 2000 114
726 Hewlett-Packard HP 100LX, Hewlett-Packard 48
683 Insight 486-33 MHz ValueLine, Insight Computers 114
684 Keydata 486SX/25 Keystation, Keydata 119
685 Micro Express ME 486DLC/40, Micro Express 119
686 MIS 425SX, MicroNiche Information Systems 119
687 Netis N425VL, Netis Technology 120
644 New 486 Systems, Packard Bell ... 72
688 Packard Bell PB425/8, Packard Bell 120
689 Polywell Poly 486-33V, Polywell Computers 124
690 Quill Qtech PCS-4S25, Quill Computer Products 124
691 Silicon Valley SVC 486SX/33 35 Pylon II, Silicon Valley Computers 124
692 Tandy 425 SX, Radio Shack 126
693 USA Flex 486SX/25, USA Flex 126
641 WinBook, Micro Electronics 69
694 Xinetron X/LAN Station 486SX, Xinetron 126

Database Management

608 AceFile 2.0, Ace Software 198
609 Approach for Windows 2.0, Approach Software 198
653 askSam for Windows, askSam Systems 79
610 DataEase Express for Windows 1.0, DataEase Int'l 199
660 DataPerfect 2.3 for DOS, WordPerfect 84
607 FileMaker Pro for Windows 2.0, Claris 198
612 Microsoft Access 1.0, Microsoft 203
611 Paradox for Windows 1.0, Borland Int'l 206
613 SuperBase 2.0 for Windows, Software Publishing 202

Database Utility

663 FileMaker Pro Translator, Claris 89

Desktop Publishing

719 Express Publisher for Windows 1.0, Power Up Software 178
721 Microsoft Publisher 1.0, Microsoft 178
650 PagePlus 2.0 for Windows, Serif ... 78
720 Publish It for Windows 1.0, Timeworks 178

Development Tool

649 Microsoft Visual C++ 1.0, Microsoft 75

Disk Drive

646 MiniPort 42/85, MiniStor Peripherals 72
645 MXL-105-III, Maxtor 72

E-mail

729 cc:Mail for Windows 2.0, Lotus Development 54

Entertainment/Game

600 Contraption Zack, Mindscape ... 297
601 David Leadbetter's Greens, MicroProse Software 297
602 Links 386 PRO, Access Software 297
603 Underworld II-Labyrinth of Worlds, Origin 297

Image Editing

647 Adobe Photoshop 2.5 for Windows, Adobe Systems 74

LAN Operating System

654 LANtastic 5.0, Artisoft 80

Mail Order

670 Acma 486SX-33 VESA, Acma ... 105
671 ALR Flyer SD 4/25s Model 80DW, ALR 105
673 ATronics ATI-486SX/33, ATronics Int'l 106
674 ATS 486-33, ATS Computers 106
676 Blackship BLK 486DX/33 LB, Blackship Computer Systems 110
679 Dell 425s/L, Dell 111
680 Diamond DT 486DLC/40, Diamond Technologies 111
681 First Computer FCS 486SX-33, First Computer 114
682 Gateway 2000 4SX-25, Gateway 2000 114
683 Insight 486-33 MHz ValueLine, Insight Computers 114
684 Keydata 486SX/25 Keystation, Keydata 119
685 Micro Express ME 486DLC/40, Micro Express 119
686 MIS 425SX, MicroNiche Information Systems 119
687 Netis N425VL, Netis Technology 120
689 Polywell Poly 486-33V, Polywell Computers 124
690 Quill Qtech PCS-4S25, Quill Computer Products 124
693 USA Flex 486SX/25, USA Flex 126
694 Xinetron X/LAN Station 486SX, Xinetron 126

Mapping Software

661 Atlas GIS, Atlas Pro, Atlas MapMaker; Strategic Mapping ... 89
648 Maps&Data, MapInfo 75

Miscellaneous

714 Office Layout 1.0, Autodesk Retail Products 293

Multimedia Software

651 Compel 1.0, Asymetrix 78

Personal Information Manager

652 PackRat 5.0, Polaris Software 79

Power Supply

725 Minuteman Alliance A300, Alliance A425; Minuteman 84
659 Tripp Lite BC 400, Tripp Lite 84

Presentation Graphics

727 Bravo, Alpha Software 48

Printer

658 Epson Stylus 800, Epson America 84
728 Hewlett-Packard LaserJet 4L, Hewlett-Packard 50

Project Management

712 Guide Line, Guide Line Maker; Symantec 293

Shareware

639 Stress Free, LifeTime Software 236

Spreadsheet

730 1-2-3 4.0 for Windows, Lotus 46
713 Improv for Windows Release 2.0, Lotus Development 293

Spreadsheet Utility

657 Forecast for Excel, Intex Solutions 84
606 The Judd Test: Lotus 1-2-3, Mentrix 226

User Group

621 Greater Cleveland PC Users Group, Dan Hanson 221

Utility

622 386Max, Qualitas 222
629 Cache86, The Aldridge Co. 216
630 Fast 4.13, Bloc Publishing 216
637 Flash 9.0, Software Matters 216
633 HyperDisk 4.50, HyperWare 216
634 Lightning for Windows, Lucid ... 216
620 LJVGA, Ares Technologies 220
638 Norton Utilities 6.01 NCache, Symantec 216
631 PC Tools 8.0 PC Cache, Central Point Software 216
623 QEMM-386, Quarterdeck Office Systems 222
665 Searcher 3.0 for Windows, Searcher Professional 2.0; Cognitronix 89
636 Super PC-Kwik 5.01, PC-Kwik 216
723 The Uninstaller, MicroHelp 300
722 Uninstall for Windows, It's Your Money 300
632 Vcache 6.00, Golden Bow Systems 216
635 Windows 3.1 SmartDrive 4.0, Microsoft 216
724 WUGNET, Windows User Group Network 300

Word Processing

716 Ami Pro 3.0, Lotus Development 178
717 Microsoft Word for Windows 2.0, Microsoft 178
718 WordPerfect 5.2 for Windows, WordPerfect 178

Local Bus	X Ready	MPC Ready	Novell Ready	UNIX Ready	CAD Ready	Work Stations
80486DX2-66	80486DX2-66	80486SX-25	80486DX2-66	80486DX2-66	80486-33	80486DX2-50
VESA IDE	X Emulation	Upgradable	EISA Ethernet	16 Port EISA	VESA IDE	Ethernet
64K Cache	64K Cache	MPC Kit	64K Cache	64K Cache	64K Cache	64K Cache
4MB SIMM	4MB SIMM	4MB SIMM	16MB SIMM	32MB SIMM	8MB SIMM	4MB SIMM
120MB IDE	Ethernet	120MB IDE	660MB SCSI	1.2GB SCSI	120MB IDE	120MB IDE
1.2 & 1.44 Floppy	1.44 Floppy	1.2 & 1.44 Floppy	1.2 & 1.44 Floppy	1.2 & 1.44 Floppy	1.2 & 1.44 Floppy	1.44 Floppy
VESA VGA	VESA VGA	1MB VGA	256K VGA	256K VGA	VESA VGA	1MB VGA
14" NI VGA	17" NI VGA	14" NI VGA	14" Mono VGA	14" Mono VGA	20" NI VGA	14" NI VGA
101-Key KB	101-Key KB	101-Key KB	101-Key KB	101-Key KB	101-Key KB	101-Key KB
Mouse	Mouse	Mouse	Mouse	Mouse	Mouse	Mouse
DOS 5.0	DOS 5.0	DOS 5.0	DOS 5.0	DOS 5.0	DOS 5.0	DOS 5.0
Windows	Windows	Windows	Windows	Windows	Windows	Windows
Desktop	Desktop	Desktop	Tower	Tower	Tower	Desktop
$2,695	$3,695	$2,095	$4,695	$6,695	$4,895	$2,195

MIS Computer Systems is proud to **enter its fifth year** providing **high end**, **quality systems** to **intelligent buyers** who are looking for **value** as opposed to the lowest possible price. The purchase of a computer system is an investment and the phrase, "**You get what you pay for**", has never been more appropriately applied than it is today in the computer industry. Give us a call right now to learn how little **VALUE** can cost.

intel inside™

MICROSOFT® WINDOWS™ READY-TO-RUN

Please call **800-733-9188**

to order and for other configurations.

MIS
COMPUTER SYSTEMS
935 Benecia Avenue
Sunnyvale, CA 94086
FAX: (408)730-5933

MADE IN THE U.S.A.

Prices and terms are subject to change without notice. 30 days money back does not include shipping charge. CA residents add appropriate sales tax. No surcharge on credit card purchases. Personal and company checks require 2 wks clearance. The Intel Inside Logo is a trademark of Intel Corporation. All other names and logos used here are registered trademarks of their respective companies.

Circle 172 on reader service card

WE ACCEPT PO'S FROM QUALIFIED FIRMS

M E M O R Y

NO SURCHARGE FOR MC, VISA AE & DISCOVER

★★ CALL TOLL-FREE 800-433-3726 ★★

★★ CO-PROCESSOR SALE ★★

INTEL 80387, 16SX or 16DX:	**59.00** *each*
INTEL 80287XL, Does6, 8, 10, 12 MHz:	**74.00**
INTEL 80287DX Does16, 20, 25, 33 MHz:	**89.00**
INTEL 80387SL for SL Based NTBKS:	**89.00**
CYRIX 83D87-40MHz for 40 MHz:	**109.00**

HP LASER 4 MEMORY
2Meg – **80.00** 4Meg – **149.00**
8Meg – **309.00**

"We buy large volume of excess inventory."

Individual D-RAM Chips

MEMORY FOR IBM & APPLE

	60NS	70NS	80NS	100NS
1Megx1	4.75	4.50	4.25	–
1Megx4	24.00	20.00	18.00	–
1Megx4 (Zip Pack)	25.00	21.00	19.00	–
256 x 4 (Video Zip)	–	–	15.95	12.95
256x4	4.75	4.50	–	–
256 x 1	3.00	2.60	2.20	2.00
64x4	–	–	3.00	–
64x1	–	–	–	1.50

INTEL Math Chips

8087	49.00
8087-2	69.00
8087-1	89.00
80287-XL	74.00
80387-16 DX	59.00
80387-20 DX	65.00
80387-DX (Does All)	89.00
Intel SX (Does All)	89.00
Intel SL Mobil	89.00
Intel 16SX	59.00

SIMM MODULES (Add $5.00 for SIPP)

	40NS	53NS	60NS	70NS	80NS	100NS
1Meg x 9	69.00	54.00	38.00	37.00	36.00	34.00
4Meg x 9	–	–	164.00	139.00	134.00	–
16Meg x 9	–	–	–	749.00	–	–
16Meg x 9 (9 chip)	–	–	–	1299.00	–	–
16Meg x 9 (36 chip)	–	–	–	699.00	–	–
256 x 9	–	–	20.00	19.00	18.00	17.00
256 x 36 1Meg (72 PIN)	EISA	–	–	–	50.00	–
512 x 36 2Meg (72 PIN)	EISA	–	–	85.00	80.00	–
1 x 36 4Meg (72 PIN)	EISA	–	169.00	159.00	149.00	–
2 x 36 8Meg (72 PIN)	EISA	–	309.00	299.00	299.00	–
4 x 36 16Meg (72 PIN)	EISA	–	619.00	609.00	599.00	–
8 x 36 32Meg (72 PIN)	EISA	–	–	1475.00	1450.00	–
16 x 36 (64Meg)	–	–	–	5900.00	–	–

CYRIX FASMATH PROCESSOR

Programs executed up to 3X faster • Plug & object code compat. w/Intel
83D87-40MHz – **109.00** 83D87-33MHz – **84.00** 83S87-25SX Ver. – **79.00**
83587-33SX – **99.00** **PC Week™** rated #1 over all math chips
5 Year Warranty • "All Downward Compalible"

AST MEMORY MODULES

MODEL	AMT. UPGRADED	AST PART #		PRICE
Advantage 12-386	4Meg Kit	500510-004		Call
8ravo 486/25, 33	2Meg Kit	500780-005		120.00
	8Meg Kit	500780-001		298.00
8ravo 486	2Meg Kit	500987-001		99.00
	4Meg	500987-002		159.00
	8Meg Kit	500987-003		318.00
	16Meg	500987-004		599.00
	32Meg Kit	500987-005		1200.00
Premium 386/25, 16 SX	1Meg	500718-001		55.00
Premium 386/33	1Meg	500718-002		56.00
Premium II	1Meg	500780-003	WPB	60.00
386SX20, 486-25, 25E, 33	4Meg	500780-004	WP8	149.00
Premium Tower, 386/33TE, 486/25TE, 486/33TE	8Meg	500780-001	WPB	298.00
Cupid Memory 8oard	0-32Meg	500818-001		Call

ZENITH MEMORY MODULES

MODEL	AMT. UPGRADED	AST PART #		PRICE
Z386/33, 25, 20, 33E	1Meg	ZA3800ME		50.00
Z386/33, 25, 20, 33E, 486/25E	4Meg	ZA3800MK		149.00
Z386SX	2Meg	Z-605-1	modules	99.00

MAGNAVOX

286/386SX-16, 386SX-20, 486SX-20 & 386-33
all are 72PIN SIMM:
1MEG – 50.00
4MEG – 149.00 8MEG – 309.0016 BIT

DELL

420, 425, 433, 450, DE, SE, TE
2/4Meg Kit – 129.00/199.00
8/16 Meg – 319.00/619.00
32 Meg – 1399.00
Call on other Dell Machines

MEMORY BOARDS
IBM Compatibles & PS/2

BOCA AT PLUS

DIP SIMM

16 BIT MEMORY BD. FOR 286, 386 AT • 0K-8Meg Bd. 4.0 LIM Compat. • New 5 Yr. Warr. Convent., Expnd. & Extnd. Memory • Supports DOS, DS/2, LIM/EMS & EEMS • Versatile Split Memory Addressing • Dperates w/CPU Speeds to 33 MHz • Supports Desqview, Multitask operations • ***Bd. made by Boca Research, AT plus***
0K – $99.00 2Meg – $169.00 4Meg – $249.00 8Meg – $379.00

BOCA XT 8 BIT BUS

• Expanded memory for XT • Lim 4.0 compat. 0-2Meg • Uses 256x1-100
0-K – **$99.00** 1Meg **$179.00** 2Meg – **$219.00**

IBM P/S2 32BIT EXPANSION BD.

0-32Meg, Ext.-Expnd. Memory Bd. for P/S2 70, 80, 90, Lim 4.0

0Meg	2Meg	4Meg	8Meg	16Meg	32Meg
$179.00	$258.00	$328.00	$477.00	$799.00	$1,499.00

PS/2 MCA 0-8MEG EXPANSION BD.

0-8Meg Extended and/or Expanded Memory for all IBM P/S2 Models 50, 50Z, 60, 55SX, 65SX, 16 Bit, 4.0 LIM Compat.
0K – **119.00** 2Meg – **190.00** 4Meg – **265.00** 8Meg – **410.00**

USES 1 X 9 SIMMS BOCA BR MC-80

IBM PS/2 SIMM MODULES

IBM PART NO.	WORKS WITH MODEL NO.	PRICE
30F5348 (512K)	30-286	30.00
30F5360 (2Meg)	30-286, 25-286, 50 MTHR BD.	85.00
33G9288 (2Meg)	Thinkpad 300.	109.00
33G9288 (8Meg)	Thinkpad 300.	399.00
6450375 (1Meg)	80-041	79.00
6450379 (2Meg)	80-111, 311-121, 321, 081, 161	99.00
6451060 (4Meg)	80-A21, A-61, 80-A31, 80-111, 80-311	199.00
6450603 (1Meg)	35SX, 40SX, 55SX, Model-70's, P-70	54.00
6450604 (2Meg)	70-061, E61, 121, 50Z, 55SX, 65SX, P-70, 55LS, 65LS, X-Station 120 & 130, 35SX, 35LS, 40SX	77.00
6450608 (2Meg)	70-A21, A-61, B-21, B-61, 35SX, 35LS, 40SX Value Point 325T	84.00
78X8955 (128K)	25	35.00
34F2933 (4Meg)	35SX, 40SX, 55SX, 65SX, 55LS, 65LS	149.00
87F9977 (4Meg)	55SX, 55LS, 65SX, 40SX, 35SX, 35LS	149.00
1057035 (512K)	P/S1-286	40.00
92F9935 (2Meg)	P/S1 & P/S1/386SX-2121	84.00
92F9694 (4Meg)	P/S1 & P/S1/386SX, Model-2121	149.00
6450902 (2Meg)	56, 57, 57SX,90, 95, P-75, 57SLC Value Point 77 486DX2, 486SX, SVR 85	89.00
6450128 (4Meg)	57SX, 90, 95, P-75, 57SLC, 56, 56SLC, P/S1, 386SX, Models-2123, 2133, 2155, Value Point 77 486DX2, 486SX, SVR 85	149.00
6450129 (8Meg)	35SX, 40SX	299.00
6450130 (8Meg)	56, 57, 57SX, 90, 95, P-75, 57SLC Value Point 77 486DX2, 486SX, SVR 85	299.00
79F0999 (2Meg)	LX40, N33SX, PS Note	99.00
79F1000 (4Meg)	LX40, N33SX, PS Note	159.00
79F1001 (8Meg)	LX40, N33SX, PS Note	299.00
07G1826 (2Meg)	N51 (all)	99.00
07G1827 (4Meg)	N51 (all)	169.00
07G1828 (8Meg)	N51 (all)	309.00
07G1419 (2Meg)	CL57LSX Color LpTp, Thinkpad 700, 700C	169.00
07G1420 (4Meg)	CL57LSX Color LpTp, Thinkpad 700, 700C	219.00
07G1421 (8Meg)	CL57LSX Color LpTp, Thinkpad 700, 700C	359.00
92F8804 (2Meg)	N45SL	99.00

COMPAQ MEMORY MODULES

MODEL	AMT. UPGRADED	CMPQ PART #	PRICE
DeskPro 386/33, 386/33L,	2Meg Module	115144-001	99.00
486/25, 486/33L,	8Meg Module	116561-001	289.00
486/50L, System Pro	32Meg Module	116568-001	1500.00
DeskPro 386/33L, 486/33L	(Exp Bd)	116569-001	299.00
DeskPro 386/25, 386/20	1Meg Module	113131-001	79.00
	4Meg Module	113132-001	174.00
DeskPro 386S-16MHz	1Meg Exp 8d	113833-001	110.00
	4Meg Exp 8d	113634-001	219.00
	1Meg Module	113646-001	75.00
	4Meg Module	112534-001	174.00
DeskPro 386/20E	1Meg Exp 8d	113644-001	119.00
DeskPro 386/25E	4Meg Exp Bd	113645-001	219.00
	1Meg Module	113131-001	75.00
	4Meg Module	113132-001	174.00
DeskPro 286N, 386N,	1Meg Module	118688-001	50.00
386SX/20, 386/25M, 486/33M,	2Meg Module	118689-001	85.00
486S/25M, 486S/16M	4Meg Module	118690-001	149.00
Port. 486C	8Meg Module	128877-001	309.00
M Series Exp Bd	0-64Meg	–	279.00
DeskPro 386/16	1Meg Kit	108071-001	99.00
	4Meg Kit	108072-001	269.00
	1-2Meg Exp Bd	108069-001	239.00
	4-8Meg Exp 8d	108070-001	399.00
DeskPro 286	512K Kit	113012-001	59.00
Prolinea 386	2Meg	141738-001	99.00
	8Meg	141742-001	299.00
Prolinea 486	1Meg	141682-001	55.00
	2Meg	141683-001	98.00
	4Meg	141684-001	159.00
	8Meg	141685-001	219.00

COMPAQ PORTABLES & LAPTOPS

LTE/286	1Meg 8d	117081-001	79.00
LTE/286	2Meg 8d	117081-002	99.00
LTE/286	4Meg 8d	117081-003	219.00
LTE/386S/20	4Meg Module	121125-002	179.00
LTE LITE/20, 25, 25C	4Meg Module	129769-002	179.00
LTE LITE/20, 25, 25C	8Meg Module	129769-003	349.00
LTE LITE/20, 25, 25C	16Meg Module	129769-004	699.00
LTE LITE 4/25C	4Meg Module	142337-002	219.00
LTE LITE 4/25C	8Meg Module	142337-003	389.00
LTE LITE 4/25C	16Meg Module	142337-004	Call
SLT/286	1Meg Module	110235-001	79.00
SLT/286	4Meg Module	110237-001	209.00
SLT/386	1Meg Module	118303-001	79.00
SLT/386	2Meg Module	118304-001	109.00
SLT/386	2Meg Module	118305-001	169.00
Contura 320, 325	2Meg	139497-001	99.00
	4Meg	139498-001	169.00
	8Meg	139499-001	299.00

PCMCIA VERSION 2.0 (for Palmtop & Subnotebooks)

MODEL	PRICE
S-RAM Cards 1MEG	179.00
S-RAM Cards 2MEG	319.00
Palm Modem™ 2400 *for HP LX 495*	Call
Dptical Media Card	Call

MODEL	PRICE
Flash Memory	Call
DTP	Call
Ethernet	Call

HP 95LX Palmtop computers, Dell 320 SLI, Sharp, NCR, Fujitsu

WE WILL TRY TO MATCH OR BEAT ANY ADVERTISED PRICE

All products Brand new & guaranteed • We buy excess inventory
Trademarks are registered with their respective companies.

L.A. TRADE

WE HAVE MOVED!!! NEW ADDRESS:

22825 Lockness Avenue • Torrance, CA 90501

TOSHIBA LAPTOP MEMORY

MODEL	AMT. UPGRADED	MANU. PART #	PRICE
T1000SE/XE/LE	2Meg	PC14-PA8312U	75.00
T2000/T2000SX	2Meg	PC18-PA8317U	75.00
T2000SX/T1000LE	4Meg	PC-PA8314U	149.00
T2000SX/T1000LE	8Meg	PC14-PA8315U	269.00
T2000SXE/2200SX/T1800, 1850, C	2Meg	PC-PA2000U	75.00
T2000SXE/2200SX/T1800, 1850, C	4Meg	PC-PA2001U	149.00
T2000SXE/2200SX/T1800, 1850, C	8Meg	PC-PA2002U	269.00
T4400SX, SXC T6400	2Meg	PC-PA2003U	129.00
T4400SX, SXC T6400	4Meg	PC-PA2004U	169.00
T4400SX, SXC T6400	8Meg	PC-PA2005U	299.00
T4400SX, SXC T6400	16Meg	PC-PA2010U	599.00
T4400SX, SXC, T6400	32Meg	N/A	2999.00
T4500, T4500C	4Meg	PC-PA2012U	199.00
T4500, T4500C	8Meg	PC-PA2013U	349.00
T4500, T4500C	16Meg/32Meg	N/A / N/A	799.00/2799
T3300SL	2Meg	PC-PA2006U	99.00
T3300SL	4Meg	PC-PA2007U	169.00
T3300SL	6Meg	PC-PA2008U	229.00
T3300SL	8Meg	N/A	369.00
T3300SL	16Meg	PC-PA2009U	749.00
T1200XE	2Meg	PC13-PA8306	85.00
T1600	2Meg	PC8-PA8302U	85.00
T3100	2Meg	PC3-PA7135E	149.00
T3100e	2Meg	PC9-PA834DU	85.00
T3100SX	2Meg	PC15-PA8308U	85.00
T3100SX	4Meg	PC15-PA8310U	164.00
T3200	3Meg	PC6-PA7137U	164.00
T3200SX	2Meg	PC12-PA8307U	85.00
T3200SX	4Meg	PC12-PA8909	164.00
T3200SXC	2Meg	PC19-PA8318U	84.00
T3200SXC	4Meg	PC19-PA8319U	164.00
T5100	2Meg	PC7-PA8301U	89.00
T5200/T8500	2Meg	PC10-PA8304U	94.00
T5200/T8500	8Meg	PC10-PA8313U	299.00

NOTEBOOK, LAPTOP MEMORY

ALR Venture	1Meg/4Meg		129.00/239.00
AST Notebook Prem Exec 386SX/20/25/25L	4Meg	500814-003,	139.00
AST Power Exec 3/25C	4Meg		189.00
AST Power Exec 425SL	2Meg		129.00
AST Power Exec 425SL	4Meg		209.00
AST Power Exec 425SL	8Meg		Call
AST Power Exec 425SL	16Meg		Call
AT&T Safari NSX/20	2Meg, 4Meg	PEC 37650, 37651	119.00,199.00
8ondwell 8310, Plus	1Meg	23050-09100	109.00
8ondwell 8310V, SX	1Meg		109.00
8ondwell 8310V, SX	4Meg		249.00
Dell 212, 320N, 320N+	2Meg	310-3204	119.00
Dell 325N, 325NC	2Meg	310-3210	119.00
Epson N83	4Meg	A808511	179.00
Epson N8/SL 20,25,25C	2Meg	A808771	129.00
	4Meg	A808781	219.00
	8Meg		479.00
Everex Tempo LX, LX20	2Meg	PCA 00053-0001	89.00
Everex Tempo Carrier	2Meg	PWA 0884-A-J000	119.00
Goldstar GS520 386SX/16	1Meg, 4Meg	S386-1M,S386-4M	99.00,249.00
Leading Edge D/LT 386SX	1Meg		109.00
Magnavox Metalis	1Meg, 4Meg	286, 386SX	89.00,199.00
NCR 3170	4Meg	3123-K104-V001	289.00
NCR 3170	8Meg		519.00
NCR 3170	16Meg	3123-K116-V001	999.00
NEC Prospeed 286, 386SX-16	1Meg	PC21-21	105.00
NEC Prospeed 286, 386SX-16	4Meg	PC21-22	179.00
NEC Prospeed 386	2Meg	PC31-21	129.00
NEC Prospeed 386	8Meg	PC31-22	419.00
NEC Prospeed 386SX-20	1Meg	PC43-21	109.00
NEC Prospeed 386SX-20	4Meg	PC43-22	219.00
NEC Prospeed 486SX, SX/L	1Meg	DP-410-6204	Call
	4Meg	OP-410-6205	Call
NEC Ultralite III/20, 20P, 25C	2Meg	PC47-21	Call
NEC Ultralite III/SL/25C	4Meg	PC47-22	Call
NEC Ultralite SL/20, 20P	6Meg	PC49-21	Call
NEC Ultralite III/25C	8Meg	PC47-23	Call
Packard 8ell 386SX, 286	1Meg, 4Meg	286, 386SX	89.00,199.00
Panasonic CF170, CF270, CF370	1Meg	CF-BA165	54.00
Sanyo 17/18 N8	2Meg	M8C-N8MEM2	89.00
Sharp 6781, 6881, 6785	2Meg/4Meg		109.00/209.00
Sharp PC-6220	1Meg	CE 6218	85.00
Tandon, PC 8rand, Dataworld	2Meg, 8Meg	N8386SX-20	89.00
TI Travelmate 2000	1Meg	2568034-0001	85.00
TI Travelmate 3000	2Meg	2566996-1	79.00
TI 4000	4Meg, 16Meg		199.00, 999.00
Twinhead 486SX; DX	4Meg/16Meg		229.00/999.00
Zeos 386SX Notebook	2Meg		89.00
Zenith Master Sport 386SX	2Meg	ZA-300-1	119.00
Zenith Master Sport SL, SLE	2Meg	ZA-4-4	89.00
Zenith Super Sport 286, 286E	1Meg	ZA-180-66	89.00
286E, SX	2Meg	ZA-180-64	119.00
SX Alpha	2Meg	ZA-180-86	119.00
SX Beta	2Meg	ZA-180-87	119.00
Zenith Z-Note 325L, LC	2Meg/8Meg	ZA3250-4/-5	139.00/459.00

LASER PRINTER MEMORY UPGRADES

	1MEG	2MEG	4MEG
HP 2,2D,3,3D,3P,2P,2P	–	104	164
HP 4 (8 MEG – 309)	Call	80	149
HP Paint Jet XL300 (OK Bd.–109 / 4MEG–268 / 16 MEG–745)			
Panasonic 4410/4430	–	119	189
Panasonic 4420/4450I	89	119	189
Panasonic 4450	105	–	–
Epson 6000, Action Lsr.	–	115	179
Epson Action Laser II	Call	Call	Call
IBM Laser 4019, 4019E	–	–	139
Toshiba Page Laser 6	–	115	179
Packard Bell PB9500	–	115	179

	1MEG	2MEG	4MEG
DKi 400	–	99	–
Canon L8P4	129	179	–
IBM Laser 4029	–	–	139
HP III SI	55	–	139
Panasonic 4455	–	119	–
NEC 90, 290	–	119	–
NEC 95	–	99	–
DMS 410	119	159	249
TI XL/PS17/PS35	49	–	–
STAR LS04	129	179	269
Starscript 4	129	179	269
DeskJet 500, 500C (256K)	64.00		
Compaq PagemarD 15, 20 (8 MEG – Call / 16Meg – Call)		Call	Call

H.P. COMPATIBLE FONT CARTRIDGE

DESKJET SOLUTION for DkJt 500 & Plus, 92 Fonts, 4.5 pt-30 pt 105.00
IBM 4019, 4019E, FONT CARTRIDGE 209 Fonts, Turbo Card 105.00
TURBO 25 Comparable to Pacific Data's 25 CARTRIDGES IN ONE!™, 147 Fonts *(compat. with all HP Printers except HP4 and Epson Action Laser II)* 79.00
TURBOSCRIPT™ 47 Scalable Fonts In Any Point Size (HP 2, 2D – 159) 149.00
TURBOSCRIPT™ 109, 109 Scalable Fonts to Any Point Size (HP 2, 2D – 199) .. 179.00
TAX & FINANCE FOR IBM 4019, 4019E, 4029 .... 139.00
TAX & FINANCE CARTRIDGE 84.00
OKI 400, 800 41 fonts, 11 typestyles 169.00

NO SURCHARGE FOR MASTERCARO, VISA OR DISCOVER. PURCHASE ORDERS ACCEPTEO FROM FORTUNE 2000, GOVERNMENT & INSTITUTIONS. Price & availability subject to change. California orders add 8.25%sales tax. Returned orders or ordered wrong parts are subject to a 20% restocking fee. (Memory chips not installed in boards.) We accept International orders shipped via UPS Air, APO, FPO orders welcome. Customers are expected to pay customs and "other" charges if shipped Int'l. All credit card charges verified for fraudulent use. SORRY, NO REFUNDS AFTER 30 OAYS – EXCHANGES ONLY. We accept MC, VISA, Discover, AE, prepaid orders, purchase orders, wire transfer, COO (cashiers check) orders, cash & cashiers checks. Orders shipped by UPS, FEOX must be signed for • ALL MANFACTURER PART #'S ARE FOR REFERENCE ONLY • MINIMUM ORDER $40.00

310-539-0019
FAX: 310-539-5844

WE'VE MOVED!!!!!

CALL TOLL FREE **1-800-433-3726** (US and Canada)

ESTAB. 1985

Mon-Fri, 8:00 a.m. to 5:00 p.m. PST
Sat. 10:00 a.m. to 12:00 noon

Top Quality Peripherals For Over 16 Years!

FLEX

PRINTERS

IBM® PRINTERS BY LEXMARK™

LASER PRINTERS

LaserPrinter 4019 E	$749
LaserPrinter 6	$969
LaserPrinter 10	$1129
NEW LaserPrinter 4039 10R	$1369
NEW LaserPrinter 4039 12R	$1729
NEW LaserPrinter 4039 10D	$1899
NEW LaserPrinter 4039 12L	$2459
NEW LaserPrinter 4039 16L	$2799

PORTABLE PRINTERS

Black or White $349

EPSON LASER PRINTERS — EPSON

ACTION LASER 1000	$644
ACTION LASER 1500	$789
EPL-8000	$849

EPSON DOT MATRIX PRINTERS

LX-810	$169	LQ-860 Color	$554
AP 3250	$189	LQ-1170	$589
FX-870	$264	LQ-2550 Color	$869
FX-1170	$349	DFX-5000	$1269
LQ-870	$429	DFX-8000	$2139

NEW LQ-570 + ... CALL
NEW LQ-1070 + ... CALL

Panasonic Office Automation

LASER PRINTERS

KX-P4410	$599	KX-P4451	$1349
KX-P4430	$849	KX-P4455	$1679
KX-P4450i	$1039		

DOT MATRIX PRINTERS

KX-P2180	$159	KX-P1624	$324
KX-P1123	$194	KX-P1695	$344
KX-P2123	$224	KX-P1654	$514
KX-P2124i	$275	KX-P2624	$354
KX-P2124	$299		

CD-ROM SPECIALS

MultiMedia CD/ROM Upgrade Kit *for only...* **$299**

- **Mitsumi Internal CD-ROM**
  - 350 MS ACCESS TIME
  - Includes controller card, cable & device driver
- **Sound Galaxy Nx II**
  - Supports AdLib and Sound Blaster, Covox and Disney
  - Two Stereo Speakers
  - 11 Voice FM Music Synthesizer
  - Includes Software: Windat™, SoundScript, JukeBox, Sound Tracks, Galaxy Master and Windows 3.1 Drivers

~Software Bundles!~

5 Educational Titles or 5 Entertainment Titles Your Choice Only $139

When puchased with CD-ROM Upgrade Kit

FLEX fax

Information At Your Fingertips 24 Hours A Day

1-708-351-5419

Product Specification
Monthly Specials
Tech Support Hints
Clearance Items

NEC

LASER PRINTERS

SILENTWRITER Model 95f
- 6ppm • 2MB memory exp. to 5MB
- 300 dpi, accepts model 9510 fax kit
- 35 scalable & 22 HP LaserJer fonts
- Genuine Adobe PostScript, Level 2, HP laserJet III w/HPGL (PCL Level 5) emulation. $1249

SILENTWRITER Model 95fx
- Same as model 95f upgraded with built-in plain paper send/receive fax capability $1449

SILENTWRITER Model 97
- Same as model 95f upgraded with 10 ppm and envelope feeder. Opt. fax upgrade available $1499

SILENTWRITER Model 97fx
- Same as model 97f upgraded with built-in plain paper send/receive fax capability $1699

SILENTWRITER Model 990 — Only... $990
- High performance RISC processor
- Up to 8ppm laser printer
- 35 scalable Adobe fonts & 14 HP LaserJer fonts
- 300 dpi • 2MB exp. to 4 MB
- First 90 days On-site Service by NEC

Canon $50 Mail-in Rebate on Canon BJ-200

BUBBLE JET PRINTERS

BJ-5	$199	BJ-300	$329
BJ-10ex	$244	BJ-330	$499
BJ-200	$279*	BJ-800C	$1549
		BJ-820C	$1659

LASER BEAM PRINTERS

LBP-4SX	$699	LBP-8SX	$1299

*After rebate. Offer Ends 5/30/93

MONITORS

NEC

14" 2A	$349
15" 3FGx	$599
15" 3FGe	$609
15" 4FGe	$719
17" 5FGe	$1099
17" 5FG	$1249
21" 6FG	$2299

NEC Specials
NEW 3D with 2 year warranty
14" 3D $459

NEC "OEM" Monitors
17" 5FG* . $1129
21" 6FG* . $1999

SAMSUNG

14" CVL4955	$219
14" SyncMaster 2	$249
14" SyncMaster 3	$299
14" SyncMaster 3n	$339
15" SyncMaster 15C	$489
17" SyncMaster 4 Plus	$779
17" SyncMaster 5C	$899

FLEXVISION

14" 1024X768	$299
15" 1280X1024	$429

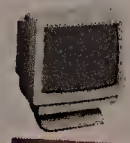
CTX

14" 5439-A	$249
14" 5468	$289
14" CPS 1461	$315
15" CPS 1560	$459
17" CPS 1760 Proscan	$829

MAG INNOVISION

15" MX15F	$599
17" MX17F	$1049

Panasonic Office Automation



14" C1381I	$329
14" C1395	$429
17" C1795E	$1239

SONY

14" CPD-1320	$339
14" CPD-1430	$599
17" CPD-1604S	$1049

TOSHIBA LAPTOPS

T1850 25MHz i386SX, 80MB/120MB	$1449/$1629
T1850C 25MHz i386SX, W/Windows & Trackball 80MB/120MB	$2099/$2319
T3300SL 25MHz i386SL, 120MB	$2129
T4400C 25MHz i486SX, 120MB	$3389
T4400C 25MHz i486DX, 200MB	$4069
T4500 20MHz i486SX 80MB/120MB	$1849/$1999
T4500C 20MHz i486SX, 120MB	$3729
T6400* 50MHz i486DX2, 200MB (AC Power Only)	$4149
T6400C* Color, 50MHz i486DX2, 200MB (AC Power Only)	$6359

*AC power only

DRIVES

Seagate HARD DRIVES

ST351A/X 42/80*MB, IDE	$139
ST3120A 102MB, <16ms, IDE	$199
ST3144A 130MB, 16ms, IDE	$219
ST3283A 245MB, 12ms, IDE	$339
ST3283N 248MB, 12ms, SCSI	$375
ST41200N 1037MB,SCSI	$1199

Cable and frame kit sold separately. Ask your sales rep. for pricing. * 80MB with data compression.

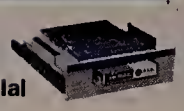
MicroSolutions

BACKPACK EXTERNAL DRIVES

Floppy Drive 3.5" or 5.25" $189
Floppy Drives require DOS 2.0 or above
Tape Drive
80/250 MB w/Data Comp. $389
Hard Drive 40 MB/100 MB $409/$499
Tape & Hard Drives require DOS 3.0 +

TAPE BACK-UP

COLORADO MEMORY SYSTEMS INC.



Ask about special on tape caddy.

JUMBO 120 120MB storage capacity
INT. SYSTEM $149 EXT. SYSTEM $239
JUMBO 250 250MB storage capacity
INT. SYSTEM $209 EXT. SYSTEM $295
JUMBO TRAKKER 120MB $339
JUMBO TRAKKER 250MB $409
POWERTAPE™ 2GB INT./EXT. .... CALL
POWERTAPE™ 4GB INT./EXT. .... CALL

DATA CARTRIDGES

3M DATA CARTRIDGES

DC2000 40/80MB	$16.99 ea.
DC2000 Form.	$18.95 ea.
DC2080 80/160MB	$21.95 ea.
DC2080 Form.	$24.95 ea.
DC2120 120/250MB	$23.95 ea.
DC2120 Form.	$26.95 ea.
DC6150 250/500MB	$21.49 ea.
DC2060 60MB Form.	$25.95 ea.
DC6250 250/500MB	$25.49 ea.
DC6525 350/700MB	$32.95 ea.

MODEMS

Hayes

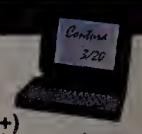
OPTIMA™ 24 + FAX96	$139
OPTIMA™ 96 + FAX96	$379
OPTIMA™ 144+ FAX144	$389
SMARTCOM EXEC	$69
POCKET EDITION™ 2400	$119

US Robotics The Intelligent Choice in Data Communications

Sportster 9600 FAX (int)	$169
Sportster 9600 FAX (ext)	$179
Sportster 14.4 FAX (int)	$189
Sportster 14.4 FAX (ext)	$209
World Port 14.4 V.42 bis (ext)	$399
Courier V.32bis FAX (int)	$399
Courier V.32bis FAX (ext)	$439

COMPAQ SYSTEMS

COMPAQ



COMPAQ Contura 3/25 (w+) 84MB/120MB	$1,479/$1,629
COMPAQ Contura 3/25c (w) 84MB/120MB	$1,999/$2,159
COMPAQ LTE Lite/25C (w) 84MB/120MB	$2,999/$3,599
COMPAQ LTE Lite/25E 84MB/120MB	$2,849/$3,029
COMPAQ ProLinea 3/25zs 40MB *141598*	$729
84MB/w+ *141595*	$829
COMPAQ ProLinea 3/25s (w) 84MB/120MB	$849/$889
COMPAQ ProLinea 3/25s (w+) 84MB/120MB	$929/$999
COMPAQ DESKPRO 3/25i 84MB/w *140593*	$1,389
120MB *140597*	$1,429
COMPAQ DESKPRO 3/33i (w) 84MB/120MB	$1,389/$1,479
COMPAQ DESKPRO 4/25is (w) 84MB/120MB	$1,389/$1,479
240MB	$1,659
COMPAQ DESKPRO 386/33M 120MB *141497*	$1,969
120MB/w *141496*	$2,189
COMPAQ DESKPRO 486s/25M 120MB *129197*	$1,879
120MB/w *129196*	$2,089
COMPAQ DESKPRO 486/33M 120MB *129298*	$2,199
120MB/w *129296*	$2,399
COMPAQ DESKPRO 50M 120MB/340MB	$2,549/$3,239
COMPAQ DESKPRO 50M (W) 120MB/340MB	$2,769/$3,369
COMPAQ DESKPRO 66M (w) 510MB	$3,649

VIDEO CARDS

DIAMOND

ISA Graphic Cards

Stealth 24 - 1MB	$159
Stealth Pro - 2MB	$359

VESA Local Bus Graphic Cards

Stealth 24 VLB - 1MB	$159
Stealth Pro VLB - 2MB	$369
Viper VLB - 2MB	$409

PARADISE. Western Digital Imaging

16-bit SVGA Accelerator Card for Windows - 1MB $109

ATI Perfecting The PC

GRAPHICS ULTRA+ 1MB	$289
GRAPHICS ULTRA™ + 2MB	$329
GRAPHICS ULTRA™ PRO - 2MB	$495

ORCHID

ProDesigner II/s - 1MB	$149
Fahrenheit 1280 - 1MB	$179
Fahrenheit VA - 1MB	$209

H-P FAX MACHINES

HEWLETT PACKARD

HP FAX-200 Plain paper fax	$959
HP FAX-310 Plain paper fax	$1279

USA FLEX

TO ORDER **800-876-5606**

FAX (708) 351-7204
Government/Ed. Sales 1-800-374-9904
Government/Ed. FAX (708) 351-9871
Habla Espanol
1-800-723-5500 / 1-708-924-6780
Pour les Francophones
1-800-723-2256 / 1-708-582-6179

OPEN 24 HOURS MONDAY THRU FRIDAY SAT & SUN 9 AM. to 4 P.M.

ORDER INFORMATION: Minimum order $80. Minimum shipping and handling per order $11.95. MasterCard, Visa and Discover accepted for USA, Canade, APO, FPO and Puerto Rico. FLEXCARD accepted for continental USA only. A $10 surcharge on credit card orders for APO, FPO and Puerto Rico. C.O.D. order under $500.00, add $5.00; over $500.00, add $10.00 check warranty charge. Call for speciel UPS Red/Blue C.O.D. rates. APO/FPO, add 5% to cover additional shipping and handling. Call for PAL rates. **CORPORATE/GOVERNMENT ORDERS:** Corporations rated 1A1 or better and government agencies accepted on Net 30 terms with receipt of a valid purchase order. Leasing Plans available for qualified businesses only. **RETURN PRODUCT INFORMATION:** All returns must have prior authorization from our Customer Service Department (1-708-351-7172). All returns must be in as-shipped condition, with original packaging, including all warranty cards and manuals. Incomplete product returns, unauthorized returns and refused shipments are subject to a minimum 20% re-stocking charge. We will only accept returns on unopened and non-downloaded software. Software compatibility guaranteed only if we have downloaded it on your new FLEX system. Thirty(30) day money back guarantee applies to FLEX system only (does not include printers or other non-installed peripherals). All prices and specifications subject to change, without notice. Not responsible for typographical or printing errors. All trademarks and registered trademarks are of their respective holders.©1993 USA FLEX.

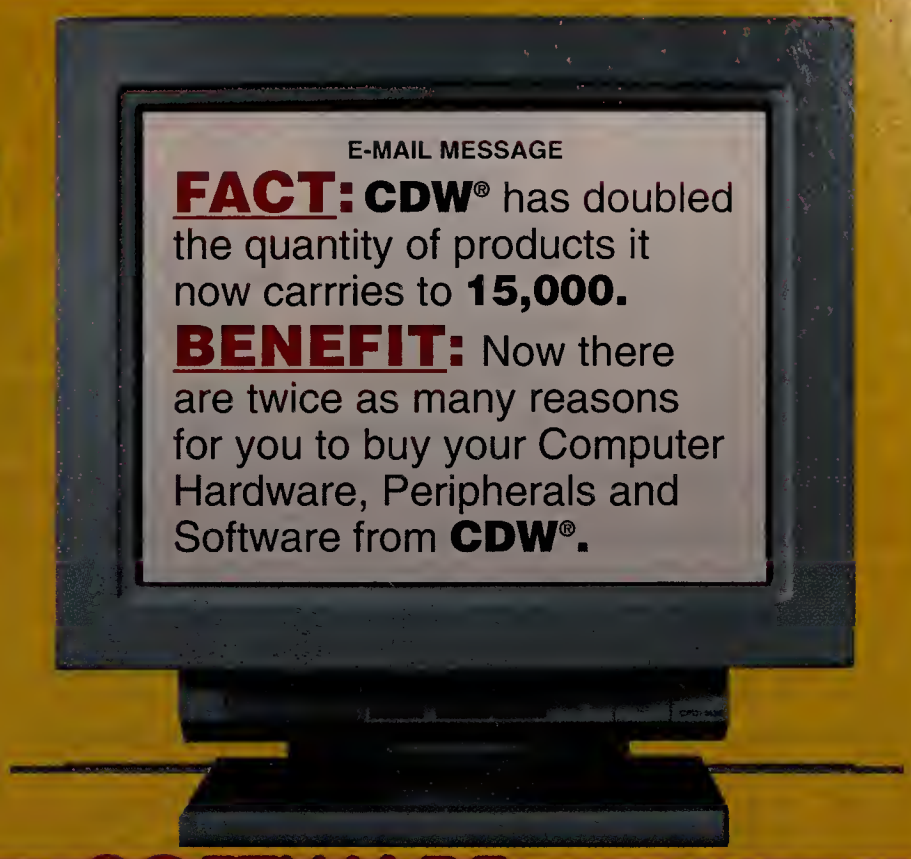
471 Brighton Drive, Bloomingdale, IL 60108

Code # WD0603

Circle 148 on reader service card

COMPUTER DISCOUNT WAREHOUSE™

AN IMPORTANT FACT ABOUT COMPUTER DISCOUNT WAREHOUSE™

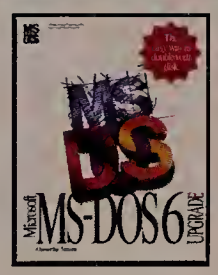


WHY PAY RETAIL? CDW® SELLS SOFTWARE FOR LESS!

MICROSOFT ACCESS for Windows
ONLY $85.42
25719

WordPerfect for Windows 5.2 Upgrade
ONLY $71.13
26514

LOTUS IMPROV for Windows
ONLY $89.99
27585



MICROSOFT DOS V 6.0 Upgrade
ONLY $47.75
27696

5TH GENERATION DIRECT ACCESS 62.07
5TH GENERA TION FASTBACK PLUS V3.1 ....87.53
5TH GENERATION FASTBACK WIN 91.81
ADOBE PHOTOSHOP FOR WIND V2.5 ....531.52
ADOBE WIN TYPE MGR V2.01 ....61.90
ALDUS PAGEMAKER V4.0 ....437.67
AUTOMAP ROAD ATLAS 55.42
APPROACH WIN COMP UPG 90.84
LANTASTIC WIN 146.97
ARTISOFT ARTICOM MODEM SHARING 204.96
ASYMETRIC DAYBOOK PLUS V1.5 ....38.33
AUTODESK AUTOSKETCH WIN 162.10
AUTOSKETCH V3.0 ....85.53
BANNER BLUE ORG ADV V6.0 ....60.13
BERKELEY AFTER DARK WIN 27.64
BITSTREAM FACELIFT WORDPERFECT 59.39
BLOC PUBL FORMTOOL GOLD 56.90
BORLAND PASCAL OBJECTS V7.0 3. ....317.70
BORLAND TURBO PASCAL V7.0 ....96.25
OUATTRO PRO 4.0 WIN COMP UPG 87.25
BORLAND BRIEF V3.1 ....87.70
BORLAND C++ 3.1 WIN/DOS 313.39
BORLAND C++ APP FRAMEWORK V3.1 ....467.74
BORLAND DBASE IV V1.5 ....389.03
BORLAND DBASE COMPILER V1 ....316.13
BORLAND DBASE IV 2.0 LIC/NODE 272.77
BORLAND DBASE IV 2.0 UPG 88.56
BORLAND PARADOX 4.0 ....501.42
BORLAND PARADOX 4.0 UPG 171.52
BORLAND PARADOX 4.0 NODE 252.87
BORLAND OUATTRO PRO 4.0 WIN/DO 88.09
BORLAND TURBO C + + DUAL V3.0 ....66.24
BORLAND TURBO C++ WIN V3.1 ....96.18
BORDERBUND WIN PRINTSHOP DELUXE 47.05
BRODERBUND PRINT SHOP DELUXE 46.66
CAERE OMNIPAGE PROFESSIONAL V2 ....523.03
CENTRAL POINT V1.4 ANTIVIR 87.94
CENTRAL POINT PC TOOLS V8.0 3. ....106.45
CENTRAL POINT PC TOOLS WIN 117.04
CALERA WORDSCAN PLUS 382.66
CNS ACT WIN 224.67
CNS ACT SOFTWARE 2.1 ....218.29
CA CLIPPER COMP UP 138.37
CA CLIPPER V5.2 ....452.80
COREL DRAW COMPETITIVE UPG 158.31
COREL SYSTEMS DRAW V3.0 ....345.81
COREL ARTSHOW 3 1992 CD 25.00
COREL SCSI SOFTWARE DRIVERS ON 65.33
DAC EASY ACCOUNTING V4.3 ....90.34
DCA CROSSTALK 16 VERSION 3.8 ....108.62

DCA CROSSTALK WIN V2.0 ....88.64
DELRINA DOSFAX PRO 50.55
XTREE WIN 63.27
XTREE GOLD V2.55 5.25/3.5 ....86.80
GAZELLE ODOS III 5.25/3.5 ....45.46
GENERIC CADD V6.0 ....248.55
HEWLETT PACKARD DASHBOARD WIN 44.30
HAYES SMARTCOM WIN 90.95
IBM OS/2 V2.0 3.5 OPERATING SO 128.95
INTEL LANDESK MANAGER V1.0 WIN 591.38
INTUIT OUICK PAY DOS/WIN 2.0 D 38.34
INTUIT OUICKEN WIN V2.0 ....41.55
INTUIT OUICKBOOK 84.40
INTUIT BUNDLE OUICKBOOK & OUIC 100.49
INTUIT OUICKEN 6.0 ....44.76
IRMA III EMULATION SFTW 222.34
KODAK PHOTO CD ACCESS 29.40
LASERTOOLS TRUETYPE WORDPERFECT 38.55
LOTUS OS/2 123 V2.0 SINGLE W/D 322.58
LOTUS OS/2 FREELANCE GRPHICS LIC NO DOCS 260.22
LOTUS CC:MAIL 10 USER PACK 216.13
LOTUS CCMAIL EXP 25USER V4.0 ....525.19
LOTUS AMI-PRO NODE WIN 184.81
LOTUS V3.4 UPG 92.94
LOTUS 123 V2.4 UPG LIC PAC 90.52
LOTUS 123 V2.4 ....318.80
LOTUS 123 2.4 SERVER 389.03
LOTUS 123 V2.4 NODE 324.19
LOTUS 123 2.4 UPG RADE KIT 92.94
LOTUS 123 WIN 275.57
LOTUS 123 WIN NODE 295.02
LOTUS 123 WIN UPGRADE 92.94
LOTUS AMIPRO 3.0 COMP UPG 88.32
LOTUS AMI PROFESSIONAL 3.0 ....221.54
LOTUS AMI PRO VER UPG 3.0 ....60.02
LOTUS FREELANCE V2.0 OS/2 ....326.35
LOTUS MAGELLAN 63.28
LOTUS ORGANIZER V1.0 ....90.12
LOTUS SMART SUITE BUNDLE 123/W 434.42
LOTUS WORKS V3.0 DUAL MEDIA 89.70
MECA MANAGING YOUR MONEY V9.0 ....34.50
MERIDIAN CARBON COPY PLUS V6.1 ....113.47
MERIDIAN CARBON COPY WIN 120.43
MICROGRAFX ABC FLOWCHARTER V2. ....288.17
MICROSOFT COBOL V5.0 UPG 165.45
MICROSOFT COBOL V5.0 ....534.92
MICROSOFT V6.1 MACRO ASSEMBLER 122.62
MICROSOFT OFFICE UPG 337.63
MICROSOFT VISUAL BAS./WIN 76.14
MICROSOFT VISUAL BASIC V2.0 3. ....116.71

MICROSOFT COMP UPG VISUAL C++ 177.67
MICROSOFT VISUAL C++ PRO UPG 128.48
MICROSOFT VISUAL C++ PROF 307.48
MICROSOFT SCHEDULE + WIN 120.16
MICROSOFT POWERPOINT LICENSE 252.69
MICROSOFT DOS V6.0 3 PACK DUAL 116.13
MICROSOFT PUBLISHER WIN 116.17
MICROSOFT VISUAL BASIC WIN PRO 295.02
MICROSOFT VISUAL BASIC PRO UPG 88.39
MICROSOFT VISUAL BASIC PRO 294.63
MICROSOFT DOS UPG VISUAL BASIC 183.94
MICROSOFT WORKGROUP ADD STARTE 344.09
MICROSOFT WORKGROUP ADD-ON USE 172.04
MICROSOFT WORKGROUP ADD-ON 3.5 ....62.50
MICROSOFT WORKGROUP ADD-ON 5 P 236.56
MICROSOFT WIN PRINTING SYSTEM 118.56
MICROSOFT FOXPRO WIND 2.0 TO 2.5 UPG 88.39
MICROSOFT FOXPRO V2.5 COMP WIN 118.45
MICROSOFT FOXPRO DOS 2.0 TO 91.51
MICROSOFT FOXPRO V2.5 DOS 294.63
MICROSOFT FOXPRO WIN DIST KIT 297.18
MICROSOFT VIDEO WIN 118.45
MICROSOFT PROFIT WIN V1.0 ....118.45
MS VISUAL BASIC C++ COMP UPG 88.30
MICROSOFT VISUAL CONTROL PACK 88.68
MICROSOFT BOOKSHELF WIN 116.08
MICROSOFT C COMPILER 7.0 ....293.94
MICROSOFT EXCEL 4.0 WIN LICENS 249.63
MICROSOFT EXCEL 4.0 ....288.86
MICROSOFT EXCEL COMP 4.0 UPG 3 ....114.55
MICROSOFT FLIGHT SIMULATOR 4.0 ....39.99
MICROSOFT OFFICE WIN V3.0 ....441.99
MICROSOFT OFFICE LICENSE PACK 372.04
MICROSOFT POWERPOINT WIN 3 ....288.86
MICROSOFT PROJECT/WINDOWS LICP 352.42
MICROSOFT TRUE TYPE FONT PACK 46.65
MICROSOFT WORD WIN V2.0 ....288.86
MICROSOFT 3.5 WORD WIN UP 112.92
MICROSOFT WIN SOUND SYSTEM 172.02
MICROSOFT WINDOWS 3.1 ....86.99
MICROSOFT WINDOWS 3.1 UPG 44.53
MICROSOFT WORD 5.5 ....202.96
MICROSOFT WORKS 86.99
MICROSOFT WORKS WIN 116.17
NORTON LAMBERT CUST & SUPPORT 112.39
FLOW CHARTING III V2.10 SERVER 128.38
PC KWIK WINMASTER /SUPER PCK 65.13
PC KWIK WINMASTER V1.5 ....65.18
PIXAR TYPESTRY WIN 153.76
POLARIS PACKRAT V4.5 ....224.24

POWERUP CALENDAR CREATOR PLUS 45.11
POWERUP CALENDAR CREATOR + WIN 45.29
DATASTORM PROCOMM PLUS V2.01 ....69.67
DATASTORM PROCOMM PLUS WIN 86.02
OUAL ITAS 386 MAX V6.0 ....59.39
OUARTERDECK DESOVIEW/X 153.45
OUARTERDECK DESOVW 386 V2.4 ....118.87
OUARTERDECK OEMM V6.0 ....59.34
QUARTERDECK OEMM GAME PACK 73.09
RIX SOFTWARE WINRIX 180.28
S-P HARVARD GRAPH DOC PK 1DOC 31.25
SPC HARVARD GRAPHICS 3.0 ....345.81
SPC HARVARD GRAPHICS 3.0 NODE 356.58
SPC HARVARD GRAPHICS WIN V1.03 ....337.69
SPC HARVARD GRAPHICS WIN V1.03 UPG 106.41
SPC PFS PRO WRITE V2.2 ....149.13
SABER LAN WORKSTATION 68.27
SABER LAN WORKSTATION NODE LIC 55.84
SHAPEWARE VISIO V1.0 WIN 188.28
SPINNAKER PFS WIN WORKS 42.17
STORAGE DIMENSIONS SPEEDSTOR 42.17
STACKER V3.0 WIN/DOS 88.39
SYM PC ANYWHERE HOST & REMOTE 110.37
SYMANTEC PC ANYWHERE HOST & RE 110.37
SYMANTEC 2.1 ANTI VIRUS 82.95
SYM NORTON B/UP V2.0 WIN 3.5 ....90.77
SYMANTEC NORTON DESKTOP WIN 2.0 ....107.01
SYMANTEC NORTON DESKTOP V2.2 W 103.74
SYMANTEC DESKTOP WIN 104.78
SYMANTEC NORTON COMMANDER V3.0 ....90.24
SYMANTEC NORTON UTILITIES V7.0 ....104.78
SYMANTEC PC ANYWHERE 4.5 REMOTE 62.82
SYMANTEC PC ANYWHERE 4.5 ....101.04
SYMANTEC PC ANYWHERE WIN 116.49
SYMANTEC PC ANYWHERE NODE 20.46
SYMANTEC O&A 4.0 ....235.48
TOUCHSTONE CHECK IT PRO DUAL 57.83
WORDPERFECT 5.1 UPG 75.76
WORDPERFECT DOS NODE W/DOC 188.57
WORDPERFECT WIN 5.2 NODE W/DOCS 191.16
WORDPERFECT PRESENTATION V2.0 ....270.97
WP OFFICE 3.1 ADD LIC NO MEDIA 46.06
WP DOS/WIND/OS2 NODE W/O MANUA 153.45
WORDPERFECT LETTER PERF ECT 83.36
WORDPERFECT OFFICE V3.1 DUAL M 86.36
WORDPERFECT PRESENTATION UPG TO V2.0 ....78.41
WORDPERFECT COMP UPG V5.2 ....95.10
WORDPERFECT DATAPERFECT 2.2 UPG 71.92
WORDPERFECT UPG KIT 5.1 TO 5.2 ....43.37
WORDPERFECT VER 5.1 ....255.91

WHY WAIT? CALL COMPUTER DISCOUNT WAREHOUSE™ NOW!

PCW682

CDW® EXTENDED HOURS
Sales:7:30-7:30 CDT Mon-Fri. / 9:00-5:00 CDT Sat.
FREE TECH SUPPORT for Customers
8:00-7:00 CDT Mon-Fri. / 9:00-5:00 CDT Sat.
(708)291-7575

Credit Card charges are not submitted until time of shipment. Freight is calculated as the carrier's actual freight charge plus insurance and packaging material. The cost of insurance is 0.30% (0.0030) of the order total. Packaging materials will not exceed $4.00 per 1 package order or $6.00 per multi-package shipment. For your protection we ship only to your verified billing address. Non-defective returns subject to restocking fee. Allow 10 business days for shipping when paying by personal check. Software, chips and other electronic components are not returnable. All pricing subject to change. ™ Trademarks of all companies listed in this ad.

WE SELL NAME BRAND ITEMS FOR LESS!

CDW CIRCLE OF SERVICE™

(800) 359-4CDW

FAX (708) 291-1737

COMPUTER DISCOUNT WAREHOUSE™ -
SERVICING YOUR PC NEEDS SINCE 1982 -
DON'T ACCEPT ANY IMITATIONS.

D & B Rated 3A1
Duns 10-762-7952

Turn the Page For More CDW® Savings.

No Surcharge For Credit Cards

VISA · DISCOVER · MasterCard · CDW

High Volume Bids Invited

©1993 CDW® Computer Centers, Inc.

Circle 58 on reader service card

COMPUTER DISCOUNT WAREHOUSE™

Canon BJ-200 BubbleJet Personal Printer

PC Magazine says, "...*many users will be hard-pressed to see any difference between this and laser printed pages without resorting to a magnifying glass.*" December 22, 1992

✓ Multi-Purpose Feeder Holds 100 Sheets Letter/Legal Paper and Feeds Them Automatically ✓ 49KB RAM ✓ 8KB Cache ✓ Parallel Interface ✓ Operates at 42 dbA or Less ✓ Canon Native, Epson® LQ and IBM X24E Emulations ✓ Weighs 6.6 lbs ✓ 2 Year Limited Warranty

CDW® Price ..... $279.12* CDW 24844

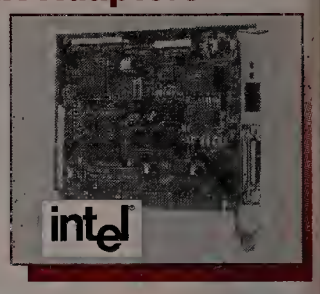
* with Mfr's $50 End-User Rebate. Rebate Ends 5/30/93

WHY SETTLE FOR LESS?

CDW® SERVICING YOUR COMPUTER NEEDS SINCE 1982

Intel Ether Express™ 16, 16TP &16C LAN Adaptors

✓ SoftSet™ Autoconfiguration ✓ Installs and Configures in Less than 5 Minutes ✓ On-board, On-Network, and Responder Diagonstics ✓ Supports Twisted-Pair and Thick-Wire Ethernet Cabling ✓ Two Data Transfer Modes—Shared Memory or I/O Data Transfer



CDW® Price..... $119.33 CDW 20754

HARDWARE, SOFTWARE & PERIPHERALS AT DISCOUNT PRICES

NETWORKING PRODUCTS

THOMAS•CONRAD

5043T 10BT Ethernet, ...122.96
5046T 10BT PS/2 Ethernet 289.14
5055 8 Port 10BT Concentrator 349.58
4 Port Passive Hub 39.88
4035 4MBPS Toke RIng Adapter 288.49
6242TP+ 8Bit TP Arcnet 98.45
6245 16-Bit Arcnet, Coax, TP, TP+....176.47
6242 Arcnet 8-Bit....66.20
6246 PS/2 Board Arcnet....214.16
6151-11 16 Port Smart Hub....709.01
6151 16 Port Arcnet Smart Hub 738.86
4045 16/4 Token Ring XT/AT 405.23
8Port Twisted Pair Active Hub....349.50
100MBPS TCNS EISA Fiber Optict....969.18
100 MBPS TCNS Smart Hub 6 Coax....1396.20
100 MBPS TCNS 18 Bit Twisted Pair....719.22
100 MBPS3047CX TCNS 32bit EISA Coax Adapt.625.58

NOVELL

NOVELL Netware V4.0....CALL
NOVELL Netware V2.2, 5-User 3.5" 469.50
NOVELL Netware V2.2, 10 User 3.5"....999.73
NOVELL Netware V2.2, 50 User 3.5"....1999.78
NOVELL Netware V2.2, 100 User 3.5"....2688.57
NOVELL Netware V3.11, 5 User 3.5"....552.17
NOVELL Netware V3.11, 10 User 3.5"....1252.17
NOVELL Netware V3.11, 20 User 3.5"....1752.17
NOVELL Netware V3.11, 50 User 3.5"....2502.17
NOVELL Netware V3.11, 100 User 3.5"....3499.96
NOVELL Lite Win/or DOS 69.00
NOVELL Lite Starter Kits....399.77
NOVELL Lite Add-On Kit....199.65
NOVELL SFT III V3.11 5 User....1713.33
NOVELL SFT III V3.11 10 User....2639.34
NOVELL SFT III V3.11 20 User....3498.20
NOVELL SFT III V3.11 50 User....4951.66
NOVELL SFT III V3.11 100 User....6933.63
NOVELL SFT III V3.11 250 User....12, 549.24
ETHERNET Interface Connector (NE1000) 129.44
ETHERNET Board (NE2000)....136.06
ETHERNET Eisa (NE3200)....687.50

ARTISOFT

AE1/T 10 Base T Adapter, 8-Bit ARS-190....109.52
AE2/T Ethernet ISA Adapter,16-Bit ARS-170...179.58
AE3 Ethernet Adaptor 219.26
Articom Modem Sharing....204.96
Central Station 399.66
NOS AI Software V5.0....66.50
NOS AI 12 User....621.07
E143 Ethernet Adapter Kit....184.79
LANtastic Ethernet Starter Kit 443.31
LANtastic AE2 Ethernet Starter Kit for Windows 489.10
LANtastic 10 Base T Starter Kit....589.20
LANtastic 2Mbps Adapter....129.54
LANtastic for Windows 149.17

CALL FOR ADDITIONAL ARTISOFT PRODUCTS

SMC®

SMC 3402TP Transceiver AUI/TP....129.62
SMC Arcnet Passive Hub....69.88
SMC Intelligent 8 Port Coax 399.99
SMC Ethernet 16 Bit Combo 8 Pack....788.88
SMC 3402F Transceiver AUI/Fiber 339.70
SMC Ethercard Plus Elite 16E 6 Pack 689.09
SMC PS/2 Arcnet 310 Board....138.79
SMC 10BT EISA BusMaster 2 Channel 609.55
SMC 3512 TP 12 Node Concentrator 599.18
SMC 3402 TransceiverAUI/BNC 137.60
Active Hub 8 Port Coax....229.88
Active Hub 8 Port Twisted Pair....345.68
3008 Coax 8-Bit Ethernet 89.82
3008 TP 10 BaseT 8-Bit Ethernet 99.53
3016 TP 10 BaseT 16-Bit Ethernet 125.50
PC 600FS Coax Arcnet File Server 16-Bit 199.00
PC 650WS TP Arcnet Workstation 16-Bit....119.88
PC 650FS TP Arcnet File Server 18-Bit....199.25

NETWORKING PRODUCTS

PC 600WS Coax Arcnet Workstation 16 Bit....119.88
SMC PC130 8-Bit Arcnet Coax 68.50
SMC PC130E 8-Bit Arcnet Coax....99.00
SMC PC270 TP Arcnet 109.33
Eisa 3200 Arcnet Twisted Pair 736.08
SMC 8-Bit 10 Base T Ethernet Elite 119.48
SMC Ethernet Plus/A PS/2 Coax Elite 209.10
SMC 16-Bit Ethernet Plus Coax Elite....129.50
SMC 8-Bit Ethernet Plus Coax Elite 99.29
SMC Combo Ethernet TP, Coax, AUI Elite....155.57

3Com®

3COM 3C503 TP 10 Base T 229.88
3COM 3C503-18 Etherlink II 16 bit 163.84
3COM 3C507 Ethernet Card....279.61
3COM 3C503 Etherlink 188.24
3COM 3C509 TP Etherlink III....137.25
3COM Ethernet Repeater....829.03

Xircom

PCMCIA Ethernet 10 BT 274.52
Ext. Ethernet LAN Adapter-RJ45AUI/BNC....393.92
PE210 BX LAN Ethernet II/Thick....285.98
PT216B3 16/4 Token RIng DB9 ....527.03
Arcnet Pocket Adaptor Coax/RJ45....239.50/234.77
Ethernet Pocket Adaptor Thin Coax/10BT299.55/329.55
Ethernet Pocket Print Server....242.50
Parallel Port Multi 72.00
PT216BT Token Ring Pocket Adaptor....539.23

TAPE, REMOVABLE & FLOPPY

COLORADO MEMORY SYSTEMS INC.

COLORADO 4GB SCSI Power Tape 1529.10
COLORADO Jumbo 120....155.37
COLORADO Jumbo 250....219.32*
COLORADO Trakker 120MB Portable Back-up..355.00
COLORADO Trakker 250MB Portable Back-up .419.21

Call For Accessories And Interfaces

I-MEGA

21 MB Floptical Insider Diskette Drive 339.00
21 MB Floptical Ext Diskette Drive....379.10
Tape 250, 250MB Tape Back-up 199.10
Bernoulli PC Powered 90/Pro....489.25/ 589.57
Bernoulli Transportable 90 Pro....639.81
Bernoulli Transportable 150 Pro....859.25
Bernoulli Insider 90 Pro 549.47

SUMMIT MEMORY SYSTEMS INC

SUMMIT 120MB Int. *99.99
SUMMIT 250MB Int....199.34
SUMMIT 305MB, Internal IDE 10MB/min....259.90

MICROSOLUTIONS

External 100MB HD....499.06
External 200MB Portable HD 582.95
Backpack External Floppy 3.5"....189.41
Backpack CD ROM 229.12
Backpack External Floppy 5.25"....189.41
External 80-250MB Tape Backup....379.30

Mountain.

MOUNTAIN TD250 Internal Tape Backup....219.50
MOUNTAIN 120MB External Tape Drive....439.90
MOUNTAIN 250MB Internal Backup 474.42
MOUNTAIN 304MB Internal IDE Backup 439.50
MOUNTAIN 250MB External Backup 1179.22
MOUNTAIN 2.0 Gigabyte External Filesafe ...1976.40
MOUNTAIN 4.0 Gigabyte, Int. 4mm DAT 1993.23
Sidecar 305MB Portable Tape Backup....515.21

Call For PS/2 Drives, Controllers, Accessory Kits and Tapes

IRWIN

IRWIN A120PC-120 MB Internal....175.19
IRWIN A250PC-250 MB Internal....209.89
IRWIN A120E-120 MB High Speed External....289.13
IRWIN A250E-250 MB High Speed External ...319.68

Call For Controllers, Accessory Kits and Tapes

*While Quantities Last

No Surcharge For Credit Cards... Means LOWER Net Cost To You!

NETWORKING PRODUCTS

IBM TOKEN RING

IBM 16/4 PS/2 MCA 609.11
IBM 16/4 XT/AT....498.27
IBM 16/4 Multi Access Unit MAU 432.26

INTEL NETWORKING

INTEL Token Express EISA 16/4 ....599.88
INTEL Ether Express 16-Bit Coax....119.53
INTEL Ether Express 16-Bit TP....119.33
INTEL Token Express XT/AT 16/A 399.23
INTEL Ether Express EISA 32-Bit....397.30
INTEL Ether Express 16bit TP 5 pk 499.43

BORLAND dBase IV LAN Pak....626.37
BORLAND Quattro Pro Network Node 244.30
CC Mail Products....CALL
HARVARD GRAPHICS LAN Pack....CALL
LOTUS 1-2-3, 2.4 Server 558.66
LOTUS 1-2-3, 2.4 Network Node 339.47
LOTUS 1-2-3, 3.4 Server 459.18
LOTUS 1-2-3 3.4 Network Node ....CALL
MICROSOFT Word 5.5 Network Node 185.39
MICROSOFT Excel Network Nodes 249.11
WORD PERFECT Office 5-User V.3.01....278.79
WORD PERFECT Office 20PK V.3.01....923.08

TERMINALS

WYSE 50 Amber or Green....349.15
WYSE 60 Amber or Green....279.92
WYSE 160/30 Amber or Green....327.98/274.89
WYSE 185 VT320 Amber, Green or White 327.60
WYSE 150 Amber, Green or White....265.45
WYSE 325 Color/ 325ES Low Emission ...519.40 / 549.39

MULTIMEDIA, SOUND, CD's, FAX

Advanced Digital Systems PC PrimeTime....389.14
Advanced Digital Systems VGA to TV Elite 267.21
Advanced Digital Systems Video Clipper....359.11
ARTISOFT, Wired for Sound....39.49
ATI Stereo FX Sound Card....89.76
COMPLETE PC Communicator Data, Fax, V Mail ..139.56**
CD-ROM Software 5 CD's Bundle, Call For Titles....129.18
COREL SYSTEMS Artshow 179.25
COREL SYSTEMS Draw CD 3.0....419.29
CREATIVE LABS Int. CD-ROM Upg Kit....388.33
CREATIVE LABS Sound Blaster....76.93
CREATIVE LABS Sound Blaster Deluxe....129.18
CREATIVE LABS Sound Blaster Pro MC....258.81
CREATIVE LABS Sound Blaster Pro 16 Bit....229.23
CREATIVE LABS Sound Blaster Professional.179.28
CREATIVE LABS MultiMedia Starter Kit....449.82
CREATIVE LABS MultiMedia Int.Upgrade Kit..549.82
CREATIVE LABS Video Blaster 349.46
CREATIVE LABS Video Blaster Windows 338.29
HP Plain PaperFax 200/310....968/1269.10
INTEL Smart Video Recorder....497.64
KEYTRONICS 101+ Keyboard 95.50
LOGITECH SoundMan 177.83
MICROSOFT Beethoven's 9th For Windows CD .49.50
MICROSOFT Bookshelf For Windows....119.20
MICROSOFT Multimedia Dev. Kit Windows 309.40
MICROSOFT Programmer's Library 249.75
MICROSOFT Windows Sound System....179.83
MICROSOFT Works For Windows CD....119.20
ORCHID Sound Producer 149.43
PRACTICAL PERIPHERALS FAX ME....175.50
SIRIUS Publishing PC Karaoke 89.26
SONY Desktop Libraries, Int. & Ext....CALL

**After Manufacturer's $150 End-User Rebate

CD-ROM & OPTICAL DRIVES

HITACHI 3700....409.30
HITACHI 1700SA External....467.42
MAGNAVOX Int MPC CD ROM 329.00
NEC CDR 38 External Portable....379.40
NEC CDR 74-1 External....589.36
NEC CDR 74 Multi-Media Bundle....819.32
NEC CDR 84-1 Internal....529.91
PANASONIC LF5010 Worm External....2199.91
PANASONIC LF7010 Ext. 1 Gb Erasable Optical ..2599.20

CD-ROM & OPTICAL DRIVES

SONY CDU-7205N External CD-ROM....453.10
SONY CDU-535 Internal CD-ROM....279.10
SONY CDU-54101 Internal SCSI CD-ROM....418.32
SONY SMO-S501 650M6 Erasable Optical 2695.42
TEXEL CD ROM Int 265 ms/ Complete Kit 439.27
TEXEL CD ROM Ext 265 ms/ Complete Kit 515.03
TEXEL Ext 265 ms/ Business Bundle Multi-Media....995.77
TEXEL Int 265 ms/ Business Bundle Multi-Media....893.21
TEXEL Int 265 ms/ Consumer Bundle 2 , Multi-Media 588.77
TOSHIBA 3301 External....509.64

PLOTTERS, DIGITIZERS & SCANNERS

KURTA®

KURTA 12 x 12 XLP/12 x 18 XLP....199.50/ 489.29
KURTA 12 x 17....538.27

CalComp

CALCOMP 12 x 12 w/16 But. 279.92
CALCOMP 12 x 18 w/16 But. 559.77
CALCOMP 2024/2036 Pacesetter ....CALL
CALCOMP Classic 4036....CALL
CALCOMP Design Mate 3024 ....CALL

Summagraphics CORPORATION

Summagraphics Summa III 12 x 12 ....253.60
Summagraphics Summa III 12 x 18....519.60
Summa Grid III 18 x 24....1083.33

HOUSTON INSTRUMENT

HOUSTON INSTRUMENTS DMP-61....2075.00
HOUSTON INSTRUMENTS DMP-161....2619.49
HOUSTON INSTRUMENTS DMP-162....3389.51

HEWLETT PACKARD

HP7575 DXL/HP7576A EXL....3265.88 / 4168.25
HP7475A/HP7550B....1309.25 / 3009.70
HP DESIGNJET 600 A-D 6029.35
HP DESIGNJET 600 A-E....6956.30
HP SCANJET IIP/HP7570A....724.10/2529.36
HP SCANJET II C Color XT/AT 1439.10

EPSON ES600C Color SCSI Scanner....837.99
EPSON ES800C Color SCSI Scanner....1088.40

VIDEO PRODUCTS

VGA & SUPER VGA MONITORS

MAGNAVOX Super VGA 1024 x 768 .39mm...259.24
MAGNAVOX Super VGA .28mm 7CM9089 ...309.00
MAGNAVOX 7BM749 Mono 14" VGA....109.50
MAGNAVOX 17" CM9217, .31mm 749.58
MAGNAVOX 20 CM64, 20 Inch....1164.00
MAG Innovision MX15F 15" 1280 x 1024 ....819.26
MAG Innovision MX17F 17" 1280 x 1024 ....1088.50
NEC Multisync 3FGX/4FG ....615.50 / 715.00
NEC Multisync 5FG/6FG....1247.93 /2298.57
NEC Multisync 2A 338.30
NANAO 17" 1280 x 1024 .28 mm FST....1109.39
PANASONIC C1381I, 1024 x 768, 14"....325.78
PHILIPS 1438, 14", 1024 x 768 ....379.86
PHILIPS 1557,15", 1024 x 768, .28 ....499.58
RELISYS, 14", .28, 1024 x 768, "....279.46
SEIKO CM1760CR....999.15
SONY 1430 14" 1024 .25mm Digital....599.95
SONY 1730/SONY 2030 ....CALL/CALL

VGA & SUPER VGA DISPLAY CARDS

ATI Local Bus Pro 2 MB 508.49
ATI EISA GRAPHICS ULTRA Pro 2 MB 579.92
ATI GRAPHICS ULTRA +1 MB/ 2 MB ...283.27/318.55
ATI GRAPHICS ULTRA Pro 1 MB/ 2 MB 426.97/496.62
ATI MCA GRAPHICS ULTRA Pro 2 MB 579.92
ATI GRAPHICS VANTAGE 1MB....174.24
ATI INTEGRA....79.38
ATI 8514 ULTRA 1MB....226.18
ATI VGA Wonder XL24 1 MB....143.23
DIAMOND Speedstar Pro Local Bus 142.28
DIAMOND Speedstar Pro VGA 138.64
DIAMOND Speedstar Stealth VESA Local 173.99
DIAMOND Speedstar 24X 1 MB....157.50
DIAMOND Viper w/2MB....414.21
HERCULES Graphite 1 MB....274.29
ORCHID Prodesigner IIS 1 MB....145.45
ORCHID Farenheit 1280 Plus, 1MB....169.17
ORCHID Farenheit VA 1MB 1280 x 1024 ....205.32

CDW® means Service ▸ CDW® means Savings ▸ CDW® means Business ▸ CDW® means Experience ▸ CDW® means Technology ▸ CDW® means Networking ▸ CDW® means Computing

PCW682

FREE TECHNICAL SUPPORT FOR CDW® CUSTOMERS. (708) 291-7575

(800) 359-4CDW

WE SELL NAME BRANDS FOR LESS!

LOOK FOR $UPER $AVINGS ON SOFTWARE. REFER TO PREVIOUS PAGE

©1993 CDW® Computer Centers, Inc.

Circle 68 on reader service card

COMPUTER DISCOUNT WAREHOUSE™

EPSON ACTION LASER 1500

Laser Printer

✓ PCL 5FX/LQ/GL Emulation ✓ 14 Bitmap, 134 Scalable Fonts ✓ 6PPM ✓ 68000CPU/16.7 MHz ✓ 150 Sheet In/ 100 Sheet Out ✓ 300 x 300 DPI with RIT ✓ Optional 250 Sheet Tray ✓ One Element Imaging Cartridge ✓ HP Compatible Font Cartridge Slot ✓ Parallel and Serial Interfaces ✓ 2 MB, Expandable to 5 MB ✓ 9"H x 14.5"W x 18"D, 22 lbs ✓ 2 Year Warranty

CDW® Price.....**$729.42** CDW 28767

WHY PAY RETAIL?

CDW® Sells For Less

AND **SERVICES** YOU BETTER

Texas Instruments TM4000 WinDX2/50

✓ 486DX2/50 MHz ✓ 8MB RAM ✓64 Gray Scales, Simultaneous LCD and CRT Display ✓1MB Video RAM ✓ Nicad Battery ✓TI Utilities, Including Battery Pro, Large Cursor, Power Management ✓ Windows 3.1 Optimized in Bios and DOS 5.0 Included ✓ MicroSoft BallPoint Mouse ✓5.6 Pounds

200 MB Hard Drive.**$2998.14** CDW 25274

HARDWARE, SOFTWARE & PERIPHERALS AT DISCOUNT PRICES

COMPUTERS

TOSHIBA

4400C DX 25MHz, 4MB,200HD ....3319.00 Color 3999.00
4400SX 25MHz, 2MB,120HD, ... LCD 2329.69
6400 486/50 DX2 200HD, Gas Plasma 3898.12
6400 486/50 DX2 200HD, Color..... 5796.23
T1850 SX/25, 4MB, 80HD,.....LCD 1252.56 Color 1826.88
T1850 SX/25, 4MB, 120HD, ...LCD 1376.44 Color 1951.15
T4500 486SX/20, 4MB, 80HD/120HD..LCD 2327.62 / 2489.98
T4500C Color 4MB, 120HD.....3659.32

AST

POWEREXEC EL 3/25 60HD / 120HD .1263.39 / 1768.42
POWEREXEC EL 3/25 Color No HD.....1615.43
POWEREXEC 3/25SL 4MB, 160HD, Color 2947.92
POWEREXEC 3/25SL 4MB, 120HD / 60 HD1936.43/1768.59
POWEREXEC 486/25SL Mono.....1515.00
POWEREXEC 4/25SL 4MB, 200HD, Color.....3115.33
Premmia 4/33SX 8MB 170HD 2099.29
Premmia 4/33D 8MB 170HD 2479.41
Premmia 4/50D 8MB 340HD 2898.53
Premmia 4/66D 8MB 340HD 3198.50
Premium Tower EISA SE 4/33 8MB,1 Floppy.....2526.39
Bravo 3/33, 4MB 120HD 969.28
Bravo 4/25S, 4 MB 120 HD 1049.10
Bravo 4/33, 4MB 120HD 1377.12
Bravo 4/50d, 2MB, VGA, DOS.....1587.85
Bravo 4/66d, 4MB, 120HD.....1879.31

Canon

INNOVA 486DX/33 Desktop 4 MB 210HD 1498.14
INNOVA 486DX/66 Desktop 4 MB 245HD 1929.32
INNOVA 386SX/25 Notebook 4 MB 120HD FX Modem 1549.00

DTK Gràfika

386/33 OX, No HD, 4MB, VGA, 2 Flop/120HD ...893.95 / 1103.50
486/33 DX, Tower, No HD, 8MB, VGA, 2 Flop/200HD..1330.23 / 1728.41
486/33 OX, No HD, 8MB, VGA, 2 Flop/200HD .1299.68 / 1694.95
486/66 OX2, Tower, 200HD, 8MB, 2 Flop, OOS, Win 2346.59

NEC

PowerMate 425 120 HD, 4 MB, SVGA 1069.74
PowerMate 433 120 HD, 4 MB, SVGA 1349.64
PowerMate 466 240 HD, 4 MB 1949.58
NEC Ready 486SX/25, 4 MB, 170 MB, 2 Floppies 1179.62
NEC Ready 486DX/33, 4 MB, 170 MB, 2 Floppies.....1479.29
NEC Ready 486DX2/66, 8 MB, 240 HD, 2 Floppies 2099.90
Versa 486/25 4MB, 120 HD.....2679.39
Versa 486/25C Color 4MB, 180 HD 3977.22
Versa 486/20C Color 4MB, 120 HD 3579.16

Texas Instruments

486 WIN SX25, 120HD, 4 MB VGA, ...1945.48
486 WIN DX2/50, 200HD 3029.76
486 WIN DX25, 200HD, 4MB, VGA 3069.15
486 WIN DX40 color, 200HD 3637.12

HARD DRIVES

Maxtor

7120A 130MB IDE 206.76
PQ-12S1029MB,13MS, 3.5" FH, SCCI-2 ...1229.84
P1-17S1503MB,13MS, 3.5" FH, SCCI-2 .....1488.12
LXT535S 535MB, 13MS, 3.5" HH,SCSI.....959.06
7345A 340MB, 13MS, 3.5" HH, SCSI-2 .....496.55
7213S 212MB, 15MS, 3.5" HH, SCSI 297.40
1240S 1240MB, 8.5MS, SCSI-2 .....1694.40
7213A, 213MB, 15MS, 3.5", HH, IDE 297.95

MICROPOLIS

MCP1664-7 345MB HH.....899.44
MCP1684-7 340 MB.....1019.86
MCP1568-15 676MB ESDI 1227.30
MCP1568-15 1345MB SCSI 1699.42
MCP1924 2070MB,14MS 5.25" FH, SCSI-2...2485.88
MCP2105 560MB, 10MS 3.5" HH, SCSI.....1089.93
MCP2112A 1000MB, 10MS 3.5" HH, IDE.....1569.59
MCP2112 1000MB, 10MS 3.5" HH, SCSI-2...1288.22
MCP1548 206MB, 14MS 5.25" FH, SCSI.....1966.94
MCP1624 668MB, 16MS 5.25" FH, SCSI. 1174.64

CONNER

CP3000 40 MB, 28MS, 3.5" HH, IDE 149.34
CP30104H 120 MB, 19MS, 3.5" HH, IDE..... 222.17
CP30084E 84 MB, 19MS, 3.5" HH, IDE.....195.76
CP30204 212 MB, 12MS, 3.5" HH, IDE. 339.63
CP301074E 174MB, 17MS, 3.5" HH, IDE.....269.58
CP30544 540MB, 10MS, IDE.....897.14
CP30540 540MB, 10MS, 3.5" HH, Fast SCSI-2,959.27
CP31370 1371MB, 10MS, 3.5" HH, SCSI-2...1892.00
CP3364 360MB, 12MS, 3.5" HH, IDE 789.83
CP30254 251MB, 14MS, 3.5" 1" IDE 376.88
CP30064H 64MB, 19MS, 3.5" HH, IDE.....179.82

HARD DRIVES & CONTROLLERS

ULTRASTOR

Ultrastor 34F Local Bus SCSI Controller 298.24
Ultrastor 12F ESDI/Floppy Controller 166.86
Ultrastor 24F EISA SCSI Controller 399.85

Quantum

PLUS Hardcard IIXL 50 MB 203.70
PLUS Hardcard IIXL 105MB 259.20
PLUS Hardcard EZ 240MB 539.45
PLUS Hardcard EZ 127MB 319.14

Seagate

ST351/AX 42MB. 28 MS 1", IDE 129.82
ST3096A. 84MB, 19MS, 3.5" HH, IDE 194.84
ST3120A 106MB 189.94
ST2511 40 MB. 28 MS, 5.25" MFM 228.41
ST3144A 130MB, IDE, 16MS 219.51
ST3243A 200MB, IDE,12MS, 3.5" HH, IDE 366.40
ST1239A 211MB, IDE 439.94
ST1480A 426 MB IDE.....819.37
ST2383A 338MB,16MS, 5.25" HH, IDE 869.27
ST4766E 766MB 1059.80
ST1624A 668 MB SCSI 1213.64
ST41200N 1050MB 1309.29
ST41650N 1042MB,15MS, 5.25" HH, SCSI.....1745.00

DOT MATRIX & LASER PRINTERS

Canon

CANON BJ10EX/BJ20 Bubble Jet .....248.40 / 299.68
CANON BJ200 Bubble Jet 279.12*
CANON BJ300 /BJ330 .....332.20
CANON LBP4SX Laser 4PPM 689.14
CANON LBP8SX Laser 8PPM.....1309.03
*After Mfr.'s $50 End-User Rebate. Ends 5/30/93

EPSON

LX810.....165.03 LQ570 Plus 234.40
FX870 .....259.74 LQ870 .....435.00
FX1170.....345.25 LQ2550 .....859.27
LQ1070 .....345.20 DFX 5000..... ....1278.00
DFX 5000 ... .1278.00 DFX8000.....2147.00
AP2250.....115.30 AP3250.....188.13
Action Laser 1000 6PPM PCL4 .....645.20
Action Laser 1500 6PPM PCL5, 2MB 729.42
EPL 8000 Laser, 10 Pages Per Minute.....1077.13

NEC

Silentwriter II 95F1119.33** P6300 .....599.50
Silentwriter II 97 .....1475.29
P6200 24-pin .....399.92 P3200 24-pin 219.88
P3300 24-pin .....322.58 P9300 .....869.21

OKIDATA

DOC-IT 4000 .....2808.11 ML393 + Color.....959.50
ML184 Turbo .....215.33 ML590.....419.20/569.52
ML320 .....299.12 OL400.....569.00
ML321 .....417.08 OL810.....909.15
ML380 .....209.00 QL830.....999.96
ML393+ .....919.20 OL840.....1069.12

Panasonic

1124 I.....284.25 1624.....339.93
1123.....199.47 4430 Laser.....869.95
2180 .....160.92 2624.....369.48
2123 .....239.09 4410 Laser Printer.....618.95
1654 .....539.86 4450i, Laser.....1099.12
4455 Laser PS 1749.78

Texas Instruments

TI MicroWriter Basic 5PPM.....639.35
TI MicroWriter PS17 /PS35.....869.19 / 1128.57
TI Microlaser TurboPlus PS.....1479.55

Hewlett Packard

CPI JETMEMORY 1MB for HPIIP/III/IIID 75.60
CPI JETPAGE for HP IIP/IID/III Postscript 184.40
Dataproducts 960 RISC PS 9PPM.....1419.95
Dataproducts 965 RISC PS 9PPM.....1935.15
H-P Deskjet 500/H-P Laserjet IIP Plus398.50/ 799.00
H-P Deskjet 550C/Deskjet Portable ...699.12 / 395.11
H-P Paintjet/Paintjet 300XL.....708.00 / 2259.18
H-P Deskjet 500 Color.....517.39
H-P LaserJet IIIP/H-P Laser 4SI .....879.10 /3229.78
H-P LaserJet 4L 679.10
H-P LaserJet 4 .....1399.46
KODAK Diconix 701/ Parallel.....318.40 / 229.22
KODAK180 SI Parallel/180 SI Serial..209.28 / 229.22
PACIFIC DATA 25 in 1 Cart. LAS3.....245.00
PACIFIC DATA 1 MB for 2P III/IIID/IIIP 79.46
SEIKOSmart Label Printer / Pro.....CALL / CALL
**After Manufacturer's $250 End-User-Rebate. Ends 4/21/93.

MODEMS & COMMUNICATIONS

U.S. Robotics

16.8 & 14.4 Courier Dual Std. External.....708.91
16.8 & 14.4 Courier Dual Std. Ext.Fax.....749.44
14.4 Sportster External.....174.98
14.4 Courier V.32 bis External.....416.94
14.4 Sportster w/Fax External 208.91
16.8 HST Courier Ext Fax.. .....519.89
9600 Sportster w/Fax External .....163.10 / 179.71
LAN Modem V.32 BIS Ethernet 305.57
9600 V.32 Worldport External.....305.57
9696 V.32 Worldport External/w/Fax 329.73
Worldport 14.4 V.42 BIS External.....896.17
Worldport 14.4 Fax Modem 397.73

Hayes

ACCURA 144 + FAX144 .....244.46
ACCURA 96 + FAX96 .....218.68
ACCURA 2400B/2400 .....59.10 / 69.25
ULTRA 144, V.32 External.....618.36
OPTIMA 14.4 + Fax14.4.....363.56 / 368.49
ULTRA 9600 External.....559.98
QPTIMA 9600 V.32/+Fax96 .....339.50 / 349.20
QPTIMA 2400/ +Fax96 .....112.34 /119.34
Pocket Edition. 69.92

Practical Peripherals

14.4 V.32 BIS, Snd/Rcv FAX Internal 188.52
14.4 Snd/Rcv Fax Mini Tower.....199.44
14.4 Snd/Rcv Fax Pocket 338.98
9600 Snd/Rcv Fax Mini Tower.....183.21
Fax Me Rcv Fax cartridge for HP Lasers 168.92

intel

SatisFAXtion 100 Int 2400 Data 9600/4800 Fax...98.50
SatisFAXtion 200 Int 2400 v.42 Data 9600 Fax....CALL
SatisFAXtion 300 Int 14.4 Data 9600 Fax 228.09
SatisFAXtion 400 Int 14.4 Data 14.4 Fax 368.95
SatisFAXtion 400E ext 14.4 Data 9600 Fax 374.95

MULTI-TECH

MULTI-TECH MT932BA 9600 .....406.62
MULTI-TECH 14.4 Ext.Fax/ Modem V.32 BIS ..436.11
MULTI-TECH MT696EA.....429.10

MATH COPROCESSORS

INTEL 387DX 16/20/25/33 .....78.99
INTEL 387SX 16/20/25 / 387SX 33 .....74.95 / 88.68
INTEL 287XL/287XLT .....78.00 / 78.00
INTEL 487SX/387SL Mobile .....118.44 / 75.88
INTEL Rapid CAD For All 386 DX's.....239.10
CYRIX FasMath SX16/20/25.....65.75
CYRIX FasMath 287 8-20MHz.....75.40
CYRIX FasMath DX33 MHz/DX40 MHz ...83.47 / 89.06

BATTERY BACKUP AND UPS

AMERICAN

Smart1250.....729.87 BACK UPS 900 .....379.88
Smart 400.....307.95 Smart 600.....399.10
BACK UPS 250 .....98.25 Smart 900.....549.55
BACK UPS 400/450/600 .....158.25 /188.68 /259.84
Smart 2000 .....1134.60

Tripp Lite

BC-250 .....99.30 BC-400 .....155.10
BC-500 .....179.55 BC-500 LAN 189.77
BC-600 LAN .....248.13 BC-900 LAN 348.51
BC-1250 LAN .....479.27 OMNI 450 LAN 269.17
OMNI 600 LAN .....348.69 OMNI 900 LAN 495.50
LapPower DC/AC 125W 59.50

MICE

APPOINT Thumbelina Trackball.....59.27
LOGITECH Fotoman Plus.....539.30
LOGITECH Mouseman Cordless..... .....79.33
LOGITECH ScanMan 32/Scanman 256 ...129.55 / 225.25
LOGITECH SerialTrackmanII/Portable.....74.99 / 95.50
MICROSOFT Mouse Bus or Serial/No Sftw. 95.50 / 79.80
MICROSOFT Mouse w/Windows 3.1.....144.95
MICROSOFT Ball Point Mouse.....109.50
MICROSOFT Serial, No Software. 79.80
ZNIX Super Mouse II w/Windows 3.1. .....75.75

KINGSTON MEMORY

EPSQN EPL7000 512K.....61.33
EPSON ACTION LASER 2-8MB 134.00
AST BRAVO LC 32MB.....1192.61
AST BRAVO 386SX/20, 386SX/25, 2MB.....113.91
AST Premium, Power II, 1MB WPB 59.93
AST Premium, Power II, 4MB WPB 180.91
AST Premium 386C 4MB 227.85
AST Premium 486/33/66, Power, 8MB.....361.85
COMPAQ DESKPRO/ProSignia 187.16
COMPAQ DESKPROi386/20E & 25E 4MB 261.31
COMPAQ DESKPRQ 386SX16 4MB 274.71
COMPAQ DESKPRQ 386SX20E 4MB 214.46
COMPAQ DESKPRQ 386SX16 4MB 214.46
CQMPAQ DESKPRQiProSignia 8MB Module 379.94
COMPAQ DESKPRO/ProSignia 16MB Module .1249.94
COMPAQ DESKPRO/ProSignia 32MB Module .2448.94
COMPAQ PAGEMARQ 20 2MB 113.91
COMPAQ PAGEMARQ 15 & 20 4MB.....168.62
CQMPAQ PAGEMARQ 15 & 20 8MB.....298.71
CQMPAQ PAGEMARQ 15 & 20 .....578.31
CQMPAQ 6 Socket BD W/32M.....1873.33
CQMPAQ DESKPRQ 386/16 8MB Exp. Bd. 599.25
COMPAQ CONTURA NOTEBOOK 2MB. 127.31
COMPAQ CONTURA NOTEBQQK 4MB. 201.33
COMPAQ LITE 4MB CREDIT CARD. 209.31
COMPAQ LITE 8MB CREDIT CARD. 469.86
COMPAQ DP 8MB 4/66I 512KB VIDEQ.....87.11
CQMPAQ PRQLINEA 486/33 1MB. 69.55
COMPAQ PRQLINEA 486/33 2MB.....119.65
COMPAQ PRQLINEA 486/33 4MB. 187.65
COMPAQ PRQLINEA 486/33 8MB. 379.33
COMPAQ PROLINEA 3/2ZS 2MB. 119.60
COMPAQ PROLINEA 3/2ZS 8MB.....381.91
HP LASERJET 2P/III 1MB.....78.42
HP LASERJET II & IID 2MB 118.71
HP LASERJET 2P/III 2MB MQDULE 109.31
HP DESKJET 500 & 500C 256KB.....93.82
HP LASERJET 3SI 4MB.....168.25
HP LASERJET 4 1MB 59.31
HP LASERJET 4 2MB 99.51
HP LASERJET 4 4MB 174.32
HP LASERJET 4 8MB 348.42
HP PAINTJET XL300 4MB 261.31
HP PAINTJET XL300 8MB 462.31
TEXAS INSTRUMENTS MICROLASER 1MB ..59.31
TEXAS INSTRUMENTS TM4000 LAPTOP 4MB..234.51
TEXAS INSTRUMENTS MICROLASER 4MB ...234.51
IBM PS/2 MOD 70-E61 1MB.....67.00
IBM IBM MOD 30 2MB 113.91
IBM PS/2 MOD 70-061 2MB 96.20
IBM PS/2 MOD 70 4MB.....299.51
IBM PS/2 MOD 55SX 4MB.....179.91
IBM PS/2 MOD 50 2MB.....241.20
IBM 4-16MB BD MOD 55S 299.51
IBM PS/1 2MB MEMORY UPGRADE 99.51
IBM PS/1 386SX 4MB UPRGRADE 179.91
IBM 386 VALUE POINT 4MB 179.91
IBM 486 VALUE POINT/PS1 4MB 209.20
IBM 486 VALUE POINT/PS1 16MB 739.44
NEC 8MB ULTRALITE.....435.51
NEC SILENTWRITER 2MB 108.31
NEC SW MOD 95 2MB 108.91
NEC 2MB ULTRALITE III/SL20 .....113.91
QKI LASER 400 2MB 127.31
OKI LASER 800 2MB 127.31
OKI LASER 810 2MB UPGRADE 194.31
OKI LASER 840 2MB 147.40
PANASQNIC 4410, 4430, 2-4MB 125.71
TOSHIBA 2MB 2000SXE.....119.00
TQSHIBA 4MB 2000SXE 179.00
TOSHIBA 3300SL 2MB 119.00
TOSHIBA 3300SL 4MB 169.00
TOSHIBA 3300SL 6MB 284.91
TOSHIBA 4400SX 16MB.....859.40
TOSHIBA 4400SX 4MB UPGRADE.....213.03
TOSHIBA 4400SX 6400 8MB UPGRADE 445.33
TOSHIBA 5200 2MB MODULE 114.29

ACCELERATOR/OVERDRIVE

INTEL Qverdrive 486/25DX / 486/33DX..479.66 / 639.55
INTEL Overdrive 486/SX,25MHz /20 MHz .449.20 / 329.44
INTEL Overdrive 486/33SX.. .....719.49
KINGSTON SX Now, 25 MHz, IBM 50, 60, 50Z .169.20
KINGSTON 486SX Now, 25 MHz, Compaq.....399.72
KINGSTQN 486DX Now, 33 MHz, Compaq.....729.89

MOST ORDERS RECEIVED BY 7:30 P.M. C.D.T. SHIP SAME DAY

IF YOU FIND A BETTER PRICE CALL US BEFORE YOU BUY
2840 MARIA, NORTHBROOK, IL 60062 FAX (708) 291-1737

CDW® Carries Over 15,000 Computer Products At Discount Prices. If You Don't See It, Call!

WHY WAIT? CALL COMPUTER DISCOUNT WAREHOUSE™ NOW!

PCW682

CDW® EXTENDED HOURS
Sales7:30-7:30 CDT Mon-Fri. 9:00-5:00 CDT Sat.
FREE Tech Support for Customers
(708)291-7575
8:00-7:00 CDT Mon-Fri. 9:00-5:00 CDT Sat.

Credit Card charges are not submitted until time of shipment. Freight is calculated as the carrier's actual freight charge plus insurance and packaging materials The cost of insurance is 0.30% (0.0030) of the order total Packaging materials will not exceed $4.00 per 1 package order or $6.00 per multi-package shipment For your protection we ship only to your verified billing address Non-defective returns subject to restocking fee Allow 10 business days for shipping when paying by personal check Software chips and other electronic components are not returnable All pricing subject to change ™ Trademarks of all companies listed in this ad

WE SELL NAME BRAND ITEMS FOR LESS!

(800) 359-4CDW

FAX (708) 291-1737

©1993 CDW® Computer Centers, Inc

Credit card charges are not submitted until time of shipment.

COMPUTER DISCOUNT WAREHOUSE™. SERVICING YOUR PC NEEDS SINCE 1982 - DON'T ACCEPT ANY IMITATIONS.

D & B Rated 3A1
Duns 10-762-7952

No Surcharge For Credit Cards

High Volume Bids Invited

Circle 65 on reader service card

LIFETIME ★ WARRANTY
100% GUARANTEED

MEMORY SUPER SOURCE

1x9 $36
70 NS SIMMS
4x9 $145
CALL FOR LATEST SIMM PRICES

HARD DRIVE SUPER PRICES
$CALL

FAST DELIVERY, GREAT SERVICE AND LOW PRICES

MATH CO-PROCESSORS

INTEL		CYRIX		IIT	
8087 5MHZ INTEL	49.00	83D87DX-16 16MHZ CYRIX	84.00	2C87-8 8MHZ IIT	54.00
8087-2 8MHZ INTEL	69.00	83D87DX-20 20MHZ CYRIX	84.00	2C87-10 10MHZ IIT	54.00
8087-1 10MHZ INTEL	89.00	83D87DX-25 25MHZ CYRIX	84.00	2C87-12 12MHZ IIT	60.00
80287-6 6MHZ INTEL	49.00	3D87DX-33 33MHZ CYRIX	84.00	2C87-20 20MHZ IIT	64.00
80287-8 8MHZ INTEL	49.00	83D87DX-40 40MHZ CYRIX	94.00	3C87-16 16MHZ IIT	84.00
80287-10 10MHZ INTEL	59.00	83S87SX16 16MHZ CYRIX	74.00	3C87-20 20MHZ IIT	84.00
80287XL 10MHZ INTEL	75.00	83S87SX20 20MHZ CYRIX	74.00	3C87-25 25MHZ IIT	84.00
80287XLT 12MHZ INTEL	75.00	83S87SX25 25MHZ CYRIX	74.00	3C87-33 33MHZ IIT	84.00
80387SX-16 16MHZ INTEL	85.00	82S87XL CYRIX	74.00	3C87-40 40MHZ IIT	94.00
80387SX-20 20 HZ INTEL	85.00	**WEITEK**		3S87SX-16 16MHZ IIT	70.00
80387DX-16 16MHZ INTEL	89.00	3167-20MHZ WEITEK	295.00	3S87SX-20 20MHZ IIT	70.00
80387DX-20 20MHZ INTEL	89.00	3167-25MHZ WEITEK	395.00	3S87SX-25 25MHZ IIT	70.00
80387DX-25 25MHZ INTEL	89.00	3167-33MHZ WEITEK	495.00	3S87SX-33 33MHZ IIT	00.00
80387DX-33 33MHZ INTEL	89.00	4167-25MHZ WEITEK	445.00		
80487SX-25 INTEL	479.00	4167-33MHZ WEITEK	695.00		
OVERDRIVE SX/DX33	749.00				
OVERDRIVE SX/DX25	599.00				
OVERDRIVE SX/DX20	499.00				
RAPID CAD	289.00				

SIMM-SIPP MODULES

4MB X 9-80NS SIMM-PC	135	256K X 9-100NS SIMM	10	1MB X 9-70NS SIPP	CALL
4MB X 9-70NS SIMM	145	256K X 9-80NS SIMM	12	1MB X 9-60NS SIPP	CALL
4MB X 9-60NS SIMM	165	256K X 9-70NS SIMM	12	256K X 9-100NS SIPP	CALL
1MB X 9-100NS 9 CHIP SIMM	33	256K X 9-60NS SIMM	13	256K X 9-80NS SIPP	CALL
1MB X 9-80NS 3 CHIP SIMM	32	1MB X 8-80NS SIMM	CALL	256K X 9-70NS SIPP	CALL
1MB X 9-80NS 9 CHIP SIMM	35	1MB X 8-70NS SIMM	CALL	256K X 9-60NS SIPP	CALL
1MB X 9-70NS 3 CHIP SIMM	33	4MB X 8-80NS SIMM	CALL	256 X 36 – 1MB	50
1MB X 9-70NS 9 CHIP SIMM	36	4MB X 8-70NS SIMM	CALL	512 X 36 – 2MB	85
1MB X 9-60NS 3 CHIP SIMM	35	1MB X 9-100NS SIPP	CALL	1 X 36 – 4MB	149
1MB X 9-60NS 9 CHIP SIMM	38	1MB X 9-80NS SIPP	CALL	2 X 36 – 8MB	299
1MB X 9-53NS 3 CHIP SIMM	50			4 X 36 – 16MB	675
1MB X 9-53NS 9 CHIP SIMM	54				
16MB X 9-70NS SIMM	675				

Quantum
FUJITSU
Maxtor
Seagate
MICROPOLIS
CONNER
WESTERN DIGITAL

Apple

POWERBOOK 160, 140, 145, 170
2MB MOD M1032LL-A $ 99
4MB MOD M1033LL-A 199
6MB MOD N/A 264
POWERBOOK 150, 100
2MB MOD N/A 130
4MB MOD N/A 200
6MB MOD N/A 295
8MN MOD N/A 340
10MB MOD N/A 460
POWERBOOK 210, 230
NOTE: THERE ARE THREE TYPES OF MODULES FOR MODELS 210 & 230. "UPGRADABLE", "BASE" AND "CONVENTIONAL". BE SURE TO PURCHASE THE CORRECT ONE FOR YOUR NEEDS.
CONVENTIONAL (STANDARD)
2MB MOD N/A 175
4MB MOD N/A 260
6MB MOD N/A 400
8MB MOD N/A 500
10MB MOD N/A 685
12MB MOD N/A 785
BASE - WILL ACCEPT 1 UPGRADE MODULE
4MB MOD N/A 300
8MB MOD N/A 500
12MB MOD N/A 695
20MB MOD N/A 2500
UPGRADE MODULES - INSTALL ON THE BASE MODULES
4MB MOD N/A 295
8MB MOD N/A 505
16MB MOD N/A 2300
MAC PORTABLE
2MB MOD N/A 336
3MB MOD N/A 529
4MB MOD N/A 662
MAC PORTABLE BACKLIT
2MB MOD N/A 232
3MB MOD N/A 519
4MB MOD N/A 585
IIGS
1-4MB E-C N/A 140
MAC PLUS
2MB KIT M0219 68
4MB KIT M02707 136
MAC CLASSIC
1-3MB E-C M6351LL-A 66
2MB KIT M0219 68
MAC CLASSIC II, LC, LCII
2MB KIT M0219 68
4MB KIT N/A 138
8MB KIT N/A 260
MAC SE
2MB KIT M0219 66
4MB KIT MD27007 130
MAC SE/30
4MB KIT M02707 138
16MB KIT N/A 610
MAC II
4MB KIT MD2707 136
MAC IIX
4MN KIT M02707 138
16MB KIT N/A 575
MAC LC
2MB KIT M0219 66
4MB KIT N/A 140
8MB KIT N/A 280
512K VRAM 47
MAC IISI, IICI
2MB MOD M0514LL-A 69
[illegible]
16MB KIT N/A 575
32MB KIT N/A 1050
64MB KIT N/A 1995
MAC IIFX
4MB KIT M0376LL-A 185
16MB KIT N/A 595
64MB KIT N/A 1995
MAC IICX
4MB KIT M02707 136
16MB KIT N/A 575
32MB KIT N/A 1050

MAC QUADRA 700, 900, 950
4MB KIT M02707 136
16MB KIT N/A 575
32MB KIT N/A 1050
64MB KIT N/A 1995
QUADRA VIDEO 700,900
512K KIT M5951LLA 60
QUADRA VIDEO 950
512K KIT M593LLA 70
PERSONAL LASER WRITER LS
512K KIT 3340114 35
PERSONAL LASER WRITER NT
2MB KIT MD219 68
8MB KIT N/A 269
LASERWRITER IINTX, IINTXJ
1MB KIT M6005 87
4MB KIT M5005 143
LASERWRITER IIF/IIG
4MB KIT M02727 139
16MB KIT N/A 575
LASER WRITER IINTR
2MB 110
MAC IIVX
4MB KIT MD292LLA 138
16MB KIT N/A 575
32MB KIT N/A 1050
64MB KIT N/A 1995
MAXIMA MEMORY MGR 50
8/3/92

AST

AST PREMIUM EXEC. 250/12, 386SX/20
1MB MOD 500814001 $ 69
4MB MOD 500814003 140
AST PREMIUM EXEC. 386SX/25, 25C, 25SL, 25SLC
4MB MOD 500814004 140
BRAVO 286
2MB KIT 500510002 70
4MB KIT 500510008 170
BRAVO 486/25, 4-23
2MB KIT 500718004 86
8MB KIT 500780001 312
BRAVO 3-25S
2MBN KIT 500710004 85
8MB KIT 500824002 290
BRAVO 3-33LC
2MB KIT 500967001 90
8MB KIT 500962002 208
BRAVO 386SX
2MB KIT 500510002 85
4MB KIT 500510008 170
BRAVO 386SX20
2MB KIT 500710003 85
8MB KIT 500824001 270
BRAVO 425S, 433LC, 450D, 466D
2MB KIT 500987001 100
4MB MOD 500987002 150
8MB KIT 500987003 206
16MB MOD 500907004 625
32MB KIT 500987005 1250
PREMIUM II 386/25, /33, 386SX/20, 486/33, 486SX/20, PREMIUM 386SX/16, 486/33E
PREMIUM 386/33TE, 486/33TE
1MB MOD 500780003 43
2MB KIT 500780005 68
4MB MOD 5007800004 149
8MB KIT 500780001 312
0-32MB E-C 500818001 279
OFFICE ADVANTAGE 386SX/20, 486SX/20
2MB KIT 500891001 80
6MB KIT 500891002 299
PREMIUM 386
4MB 500510004 214
POWER PREMIUM 3/33, 4/33 & 4/50D
2MB KIT 500780005 68
8MB KIT 500780001 312
PREMIUM WKST 286, 386SX
2MB KIT 500510002 76
4MB KIT 500510006 170
PREMIUM 386/10,C
4MB KIT 500510008 170
PREMIUM SE 4/33
2MB KIT 500780005 50
8MB KIT 500780001 312
PREMIUM SE 4/50
16MB KIT 500928001 690
32MB KIT 500928002 1300

ALR

ALR POWERFLEX
ALR FLEX CACHE 386SX
2MB KIT 12902000 $ 68
4MB KIT 12904000 156
ALR BUSINESS VEISA
ALR BUSINESS VEISA ARRAY
ALR MPS
4MB KIT 12904000 156
16MB KIT 12016000 625
0-32MB E-C 12407400 182
ALR BUSINESS STATION
ALR POWER PRO
ALR POWER PRO ARRAY
ALR POWER PRO/MC
ALR POWER FLEX FLYER, 29CX
4MB IT 12904000 156
16MB KIT 12916000 625
ALR POWER CACHE 486-486E
ALR MICROFLEX 3000
2MB KIT 12902000 80
4MB KIT 12904000 156
16MB KIT N.A 625
32MB KIT N A 1250
ALR FLYER 32LCT, 320T, 3032
1MB 32LCT ONLY 53
4MB 12901804 156
16MB 12904816 695
RANGER SERIES
4MB MOD 12928010 348
8MB MOD 12928016 940
16MB MOD N.A 1940
VENTURA NOTEBOOK 16 &20
[illegible]
4MB MOD 12407970 998

AT&T

SAFARI NSX/20
2MB C-C 37650 $ 189
4MB C-C 37651 340
6286WGS
2MB KIT 37727 175
6386, 67386EWGS
4MB KIT 37716 285
9386/SX
2MB KIT 37336 78
0-16MB E-C N/A 129
0386/25, /33WGS
2MB KIT 37251 79
STAR SERVER 486/33E
4MB KIT 37261 285
16MB KIT 37263 685
STAN SERVER 486/33S
4MB KIT 37344 235
16MB KIT 37345 885

EPSON

NB-SL/20, /25, /25C
2MB MOD A808771 $ 129
4MB MOD A808781 199
8MB MOD N/A 1280
NB3S
4MB MOD A808511 190
EQUITY LT-286
1MB MOD A808191 128
EQUITY LT-386SX
2MB MOD A808361 235
EQUITY 286 PLUS
2MB KIT A808101 80
EQUITY 386SX/16 PLUS
2MB KIT A808101 80
EQUITY 386/25 PLUS, 389SX PLUS
2MB KIT A808101 80
EQUITY 386SX/20 PLUS
8MB KIT A808631 368
EQUITY 486SX/25 PLUS
2MB KIT A808101 80
486/33, EISA & TOWERS
2MB KIT A808591 120
8MB KIT A808711 340
16MB KIT A808673 620
EPL 6000 L-P
2-4MB E-C IBS401 164
4MB E-C N/A 185
EPL 7000 L-P
2-4MB E-C C822011 225
4MB E-C C822061 348
EPL 7500 L-P
2-4MB E-C C822051 225
4MB E-C C822021 349
ACTION LASER II/EPL 4000 /4100/8000/8100
1MB E-C 80
2MB E-C 125
3MB E-C 165
5MB E-C 210
EQITY 2 PLUS CALL

COMPAQ

LTE 8088 PROCESSOR
512K MOD 117077001 $ 107
LTE 286
1MB KIT 117081001 65
2MB KIT 117081002 68
4MB KIT 117081003 175
LTE 386S/20
4MB C-C 121125002 182
LTE LITE 20, 25
2MB C-C 129769001 120
4MB C-C 129769002 169
8MB C-C 129769003 360
16MB C-C N/A 1295
SLT/286
1MB MOD 110235001 99
4MB MOD 110237001 210
SLT 386S/20
4MB MOD 118305001 169
PORTABLE III
2MB KIT 107332001 80
INTERFACE 107808001 110
EXP BOARD 107811001 250
PORTABLE 386
1MB KIT 107651001 110
INTERFACE 107707001 125
4MB E-C 107653001 346
4MB ADM 107654001 349
PORTABLE 486C
2MB MOD 118689001 76
4MB MOD 118690001 146
8MB MOD 128877001 299
DESKPRO 286
2MB KIT N/A 79
0-16MB E-C N/A 129
DESKPRO 286E
2MB KIT N/A 79
0-16MB E-C N/A 129
DESKPRO 386-16
1MB KIT 108071001 120
1MB E-C 108069001 209
2MN E-C 100069-71-001 348
4MB E-C 108070001 468
8MB E-C 108070-72-001 696
DESKPRO 386S
1MB E-C 113633001 100
4MB E-C 113634001 250
1MB MOD 113646001 75
4MB MOD 112534001 172
DESKPRO 386/20E, /25E
1MB E-C 113644001 100
4MB E-C 113645001 250
1MB MOD 113131001 75
4MB MOD 113132001 172
DESKPRO 386/33
2MB MOD 115144001 120
DESKPRO 386/33L, 486/33L
2MB MOD 115144001 120
8MB MOD 116561001 348
32MB MOD 116568001 1395
6 SOCK-EC 116569001 199
DESKPRO 486/25, /50L
[illegible]
8MB MOD 116561001 349
32MB MOD 116568001 1395
DESKPRO 386/25M, 486/33M, 486S/16M, /25M
1MB MOD 118688001 49
2MB MOD 118689001 78
4MB MOD 118690001 149
8MB MOD 128877001 299
8 SOCK-EC 129160001 291
DESKPRO 286N, 386N, 386S/20N
1MB MOD 118688001 49
2MB MOD 118689001 79
4MB MOD 118690001 149
3 SOCK-EC 118700001 80
PROLINEA 3/25S, 3/25ZS
2MB KIT 141738-001 80
8MB KIT 141742-001 295
PROLINEA 4/33, 4/66I
1MB MOD 141682-001 45
2MB MOD 141683-001 85
4MB MOD 141684-001 149
8MB MOD 141685-001 299
SYSTEMPRO
2MB MOD 115144001 64
8MB MOD 116561001 349
32MB MOD 116568001 1395
8 SOCK-EC 116569001 199
SYSTEMPRO/LT 386-25S, 486SX-25S
1MB MOD 118688001 49
2MB MOD 118689001 78
4MB MOD 118690001 149
8MB MOD 128877001 298
8 SOCK-EC 129160001 201
CONTURA 3/20, /25
2MB MOD 139497001 88
4MB MOD 139498001 168
8MB MOD 139499001 318
DESKPRO M-SERIES
SYSTEMPRO LT 486SX/25S & 325/25SE
2-64MB BD 129160 689 348
4-64MB BD 129160 690 449
0-64MB BD 129160 877 578
SYSTEMPRO/XL
16MB KIT 136816001 840
32MB KIT 136817001 1290
128MB KIT 139916001 CALL
8 SOCK-EC 139938001 SCALL
PROSIGNIA
1MB MOD 118688001 49
2MB MOD 118689001 78
4MB MOD 118690001 149
8MB MOD 128877001 299
16MB MOD 139917001 690
32MB MOD 149147001 1950
LTE 4/25C
2MB CRO 142337002 120
4MB CRO 142337003 199
8MB CRO 142337004 360

DELL

320N, 212N, 320NPLUS
1MB MOD 3133203 $ 68
2MB MOD 3103204 138
NL20, NL25
2MB MOD 3103213 149
325P, 325D, 333D, 333P, 320SX, 433P, 486D, 486P
1MB MOD 3102505 80
4MB MOD 3102507 175
486D, 486P
16MB MOD 3102625 680
420, 425, 433, 466
450DE, 450SE, 450TE
2MB KIT 3102466 115
4MB KIT 3102467 175
6MB KIT 3102468 345
TE & SE ONLY
16MB KIT 3102469 680
32MB KIT 3102630 1300
NOTEBOOK 325NC, 325N
2MB 130
433E & 425E
2MB KIT 3102389 115
4MB KIT 3102390 175
8MB KIT N/A 345
316SX
2MB KIT 3102349 85

hp

HP VECTRA 286/12, ES12PC
2MB KIT D1354A 78
0-16MB E-C 129
386/16N, /20N
2MB KIT D2406A 79
8MB KIT 02404A 295
QS/16S, RS25PC, 20PC, 20C
2MB KIT D1354A 64
386/25PC, 486UPC
2MB MOD D2381A 64
8MB MOD D2152A 299
486S/20PC, 486PC, 48625T, 48633T
1MB MOD D2150A 47
2MB MOD 02381A 64
4MB MOD D2156A 163
8MB MOD D2152A 299
9000/375, /380, 345, 400DL, 400S, 400T, 425S
8MB KIT H98229B 450
16MB KIT H98229D 852
32MB KIT H98229E 1450
9000/425T
4MB KIT H98229C 275
6MB KIT H98229B 450
16MB KIT H98229D 850
9000/433S
4MB KIT H9229C 275
9000/425E
4MB KIT A2200A 275
8MB KIT A2201A 450
16MB KIT A2202A 850
9000/720, /730
[illegible]
32MBN KIT A2512A 1625
9000/750
16MB KIT A1979A 875
32MB KIT A1987A 1595
9000/705, /710
8MB KIT A2216A 395
16MB KIT A2217A 750
32MB KIT A2218A 1395
X-STATION 700RX
1MB MOD C2320A 50
2NBN MOD C2321A 80
4MB MOD C2322A 193
8MB MOD D2152A 299
DESKJET 500C, 500 PLUS, 550C
256KB MOD H22707B 64
LASERJET II, IID
2-4 E-C H33444B 102
4MB E-C H33445B 168
LASERJET IIP, III, IIID, IIIP
2-4MB E-C H33475B 89
3-4MB E-C H33476B 125
4MB E-C H33477B 159
LASERJET IIISI
4MB MOD C2065A 140
8MB MOD N/A 299
HP-4
4MB MOD N/A 149
8MB MOD N/A 299
HP LASERJET FAX
1MB 80
PAINTJET XL300
OK EXP BD 80

OKIDATA

OL 400
1MB E-C 70014701 $ 81
2MB E-C N/A 129
OL 800, 820
1MB E-C 70015201 85
2MB E-C N/A 150
3MB E-C N/A 199
4MB E-C N/A 225
OL 830, 840
2MB E-C 70016501 185

ZENITH

MASTERSPORT 286
1MB MOD ZA2121 $ 110
MASTERSPORT 385SX
2MB MOD ZA3601 191
MASTERSPORT386SL, 386SLE
2MB MOD ZA44 99
SLIMSPORT
1MB MOD ZA18095 133
2MB MOD ZA18064 199
4MB MOD ZA18071 365
TURBOSPORT 386
1MB MOD ZA3034ME 68
TURBOSPORT 386E
1MB MOD ZA3034ME 68
4MB MOD ZA3035ME 255
SUPERSPORT 286
1MB MOD 18066 65
SUPERSPORT 286E
1MB MOD ZA18066 95
2MB MOD ZA18064 108
4MB MOD ZA18071 398
SUPERSPORT SX
2MB MOD ZA18064 108
2MB MOD ZA18086 ALPHA 168
2MB MOD ZA18087 BETA 108
Z-286LP PLUS
2MB KIT Z6051 95
0-16MB E-C N/A 129
Z-386SX, Z-386SX/20
2MB KIT Z6051 95
0-16MB E-C N/A 129
Z-386/20, /25, /33, /33E
1MB MOD Z3800ME 55
4MB MOD Z3800MK 146
Z-486/33ET
4MB KIT ZA4200M2 168
16MB KIT ZA4700M0 535

SUN

SPARCSTATION ELC
4MB MOD X1040 $ 173
16MB MOD X1160 656
SPARCSTATION IPC
4MB KIT X164Y 184
16MB KIT X116Y 850
SPARCSTATION IPX
4MB MOD X104U 173
16MB MOD X116'J 850
SPARCSTATION 2
16MB KIT X116Y' 850
SPARCSTATION 330
8MB KIT X108E 406
32MB KIT X134A 2208
SPARC1, 3/60, 80, 4/40, 60, 65
4MB KIT X104C,G,H,Y 184
SPARC SLC (4/20)
4MB MOD X105Z 173
4/110
16MB KIT X116D 850
SPARC II, 4/48, 60, 65, 75, 330, 370, 390
16MB KIT X116H,Y,WD 650
4/330, 4/370, 4/390
8MB KIT X108E 406
32MB KIT N/A 1400
SPARC10
16MB MOD X116F 700
[illegible]
SPARCSERVER 630MP, 670MP, 690
64MB KIT X168A 2100

IBM

N51SX & N51SLC
2MB MOD 07G1879 $ 120
4MB MOD 07G1880 199
8MB MOD 07G1081 330
L40SX, N33SX LAPTOP
2MB MOD 79F0999 99
4MB MOD 79F1000 149
8MB MOD 79F1001 315
P75 & P70
2MB MOD 6450902 77
4MB MOD 6450128 146
PS/1 209
512K MOD 1067035 34
2MB MOD 92F9935 85
PS/1 386SX
512K MOD 1057035 34
2MB MOD 92F9935 85
4MB MOD 92F9694 146
PS/2 25
128K KIT 78X0955 29
PS/2 25 & 30 286
512K KIT 30F5348 30
2MB KIT 30F5360 85
0-16MB E-C N/A 129
PS/2 35SX, 35LS, 40SX
1MB MOD 6450603 42
2MB MOD 6450604 75
4MB MOD 87F9977 148
8MB MOD 6450129 298
PS/2 55SX & 55LS
1MB MOD 6450603 42
2MB MOD 6450604 75
4MB MOD 87F9977 149
0-16MB E-C 199
PS/2 57SX, M57SLC, 56SX, 56SLC, 79 & 77
2MB MOD 6450902 77
4MB MOD 6450120 149
8MB MOD 6450130 299
PS/2 70-061, 70-121, 121, 061, E61
1MB MOD 6450603 42
2MB MOD 6450604 75
0-32MB E-C 189
PS/2 70-A81, -A19, -A21, -A91, B61, B21
2MB MOD 6450608 75
0-32MB E-C 169
PS/2-80 A16, A21, A31
4MB MOD 6451060 199
0-32MB E-C 169
MODEL 90XP & 953
INSTALL IN PAIRS
2MB MOD 6450902 77
4MB MOD 6450128 149
8MB MOD 6450130 299
16 BIT EXPANSION CARD FOR MODELS 50, 60, 55SX, 65SX, 55LS MAXIMUM TWO CARDS PER MACHINE
0-16MB E-C 166
1MB MOD 6450603 42
2MB MOD 6450604 75
4MB MOD 87F9977 146
8MB MOD 6450129 299
32 BIT EXPANSION CARD FOR MODELS 70 & 80 MAXIMUM TWO CARDS PER MACHINE
0-32MB E-C 166
1MB MOD 6450603 42
2MB MOD 6450604 75
4MB MOD B7F9977 149
8MB MOD 6460129 296
4018 & 4016E
3.5MB E-C 1038675 156
4029
4MB MOD 118335 157
THINKPAD 300
2MB CRD33G9288 165
8MB CRD33G2909 460
THINKPAD 700T
8MB RCD6451167 460
THINKPAD 700 & 700C
2MB MD0071419 130
4MB MD007G1420 230
8MB M0007G1421 399
N45SL
2MB MOD92F8804 115
CL57SX LAPTOP
2MB CR007G1419 130
4MB CRD07G1420 230
8MB CR007G1421 399
PS/1 CONSULTANT 2133, G11, G13, G14, ESSENTIAL W11, W1S, W14, VALUEPOINT 325T & EXPERT S11, S1S, S14
1MB MOD6450603 42
2MB MOD6450608 75
4MB MOD6450170 146
8MB MOD6450130 299
VALUEPOINT 425SX25, DX/33 & DX2/66 INSTALL IN FOURS
1MB MD096F9260 45
4MB MO096F9291 146
PRO 386SX M21-23
2MB MOD6450902 77
4MB MOD6450120 146
8MB MOD6450130 299
PS/2 80-041
1MB MOD6450375 66
PS/2 80-081, 111, 121, 161, 311 & 321
2MB MOD6450379 100
MODEL 95-50 OMF, OMT ECC MODULES
4MB MOD6451158 305
8MB MOD6451159 575
XSTATION 120 & 130
1MB VRAM4201 155
1MB MDD6450603 42
2MB MDD6450604 75
4MB MOD34F2933 146
RS/6000 POWERSTATION POWERESERVER 220
4MB MOD6450128 146
8MB MOD6450130 299
NISC SYSTEM 6000
NO BOARD INCLUDED
16MB KIT 4010 875
32MB KIT 4033 1500
[illegible]
PS NOTE
4MB N/A 169
8MB N/A 325

LASER PRINTER MEMORY

FUJITSU RX 7100, 7200N
2MB $ 295
KONICA LP3119, 3115
1MB 148
2MB 218
3MB 260
KYOCERA F1200S, F3300, F3300A
1-2-3-4MB CALL
KYOCERA F820, F1000, F1000A, F3000A, F5000
1MB 68
CITOH-4 PLUS + 6E
1MB 120
CITOH CI-6
1MB 125
2MB 165
4MB 225
CITOH CI-8
1MB 80
2MB 140
COMPAQ SCALL
PAGEMARQ 15 & 20 SCALL
DATAPRODUCTS LZR650 SCALL
EPSON EPL 4000, 4100, 8000, 9100 SCALL
PAINTJET XL300 SCALL
HP LASERJET FAX SCALL
PACKARD BELL PB9600 SCALL
AT&T 593 SCALL
TEC 1305S, 1321C, 13230 SCALL
FACIT P6060 SCALL
NCR 6435 SCALL
CITOH CI-5 SCALL
HARRIS/3M SCALL
ATARI SLM-804PCV SCALL
DASYS SCALL
MANNESMAN TALLY 905-906 SCALL
PHILLIPS NMS 1480 SCALL
IBM 4079 SCALL
KYOCERA S/800AT SCALL
NEC SILENTWRITER 2/560, 560P, 562P & 85 SCALL
SEIKOSHA OP104, CP108 SCALL
OLIVETTI PG109, PG208 SCALL
SHARP JX9700, -E, -N SCALL
QMS PS880, PS1700, 825MR SCALL
OKIDATA OL810 & 410 SCALL

TOSHIBA

T1000SE
1MB C-C PCPA8311U $ 75
2MB C-C PCPA8312U 108
T1000LE
1MB C-C PCPA8311U 75
2MB C-C PCPA8312U 108
4MB C-C PCPA2001U 150
8MB C-C PCPA2002U 306
T1000XE
1MB C-C PCPA8311U 75
2MB C-C PCPA8312U 108
T2000
1MB C-C PC18PA8316U 85
2MB C-C PC18PA8317U 108
4MB C-C PC1XPA8314U 168
8MB C-C PC1XPA8315U 306
T2000SX
4MB C-C PC14PA8314U 172
8MB C-C PC14PA8315U 386
T2200SXE, T2200SX, T1800, T1850, T1850C
2MB C-C PCPA2000U 108
4MB C-C PCPA2001U 168
8MB C-C PCPA2002U 386
T3300SL
2MB C-C PCPA2006U 130
4MB C-C PCPA2007U 174
6MB C-C PCPA2006U 248
8MB C-C PCPA2009U 575
16MB C-C PCPA2010U 758
T4400SX, T4400SXC, T6400-C
2MB C-C PCPA2003U 120
4MB C-C PCPA2004U 228
8MB C-C PCPA2005U 575
16MB C-C PCPA2010U 725
32MB C-C N/A 3850
T1200XE
2MB MOD PC13PA8306U 95
T1600
2MB MOD PC8PA8302U 95
T3100
2MB MOD PC3PA7135E 284
T3100E
2MB KIT PC9PA8341U 95
T3100SX
2MB MOD PC15PA8308U 90
4MB MOD PC15PA8310U 144
T3200
3MB MOD PC6PA7137U 120
T3200SX
2MB KIT PC12PA8307U 95
4MB KIT PC12PA8309U 170
T3200SXC
2MB KIT PC19PA8318U 95
4MB KIT PC19PA8319U 120
T5100, T5100C
2MB MOD PC7PA8301U 99
T5200, T5200C, T8500
2MB KIT PCPA8364U 99
8MB KIT PCPA8313U 318
T4500, T4500C
4MB C-C PCPA16U 250
8MB C-C PCPA2017U 445
16MB C-C N/A T.B.A
[illegible]
2-4MB E-C N80090 114
4MB E-C N80100 174

TI

TRAVELMATE 2000
1MB MOD 2568034001 $ 99
TRAVELMATE 3000
TRAVELMATE 3000WINSX
2MB KIT 2566776001 99
TRAVELMATE 4000WINSX
4MB MOD 25812650001 225
MICROLASER PLUS, XL
MICROLASER PLUS TURBO
1MB MOD 255739001 61
2MB KIT N/A 120
4MB KIT N/A 248
8MB KIT N/A 480

SILICON GRAPHICS

4D/100 & /120, 40 SERIES 200, 300, 400
8MB KIT H4C08X $ 595
32MB KIT H4D32X 1425
4D/20 PERSONAL IRIS, 4D25, 4D40, 4D50, 4D79, 4D80, 4D85, CS/12, TURBO 12 & 16
4MB KIT H4C058 170
4D/20 & 20
16MB KIT HU1C168 593
IRIS CRIMSON
16MB KIT H4C16X 870
64MB KITR N/A 2700
4D/RX, INDIGO RPC, PERSONAL IRIS & IRIS INDIGO
8MB KIT HUC08C 595
32MB KIT HUC32H 1850

Canon

LPB-4, -4PLUS, 4LITE
1MB MOD S632240 $ 145
1-2MB E-C S632230 145
2MB E-C N/A 261
LBP-8II
1-4MB E-C S631300 79
2-4MB E-C S631880 118
3MB E-C S631300 191
LBP-8III, -8PLUS
1-3MB E-C S632340 145
2-3MB E-C S632350 261
3MB E-C S632360 377

EVEREX

TEMPO LX, LX20
2MB MOD N/A $ 90
TEMPO CARRIER
2MB MOD N/A 115
TEMPO 286
2MB KIT N/A 65
TEMPO 386SX
2MB KIT N/A 85
4MB KIT N/A 120
STEP SERIES 286-12, -16, -20, 386-16 & 20
2MB KIT N/A 65
4MB KIT N/A 170
STEP SYSTEMS 386IS, 386SX/20
4MB KIT N/A 170
8MB KIT N/A 312
16MB KIT N/A 625
386/25, /33, SERVER 386 486/33, 486SX/20, 486EISA, SERVEN 486
4MB KIT N/A 170
16MB KIT N/A 625

Panasonic

CF-120, CF-270, CF-370
1MB MOD CFBA165 $ 67
4MB KIT N/A 260
KX-P4410, KX-P4420, SX-P4430
1-4MB E-C KXP443 82
2-4MB E-C KXP441 112
3-4MB E-C N/A 169
4MB E-C N/A 199
SX-P4450
1MB E-C KXP440 128
SX-P44501
1-4MB E-C KXP443 82
2-4 MB E-C KXP441 112
3-4MB E-C N/A 169
4MB E-C N/A 199
KX-P4455
2MB E-C KXP4455/2 187

QMS

QMS-PS 418
1-4MB E-C N/A $ 199
2-4MB E-C N/A 157
4MB E-C N/A 225
QMS 815, 815MR, 615
1-6MB E-C N/A 179
2-6MB E-C N/A 219
4-6MB E-C N/A 279
6MB E-C N/A [illegible]

NEC

ULTRALITE 286F
1MB MOD PC2221 $ 80
4MB MOD PC2222 199
ULTRALITE SX/20
2MB MOD PC4421 157
8MB MOD PC4422 430
ULTRALITE SL/20, SL/20P
6MB MOD PC4921 206
ULTALITE III, SL25C
2MB MOD PC4721 166
4MB MOD PC4722 299
8MB MOD PC4723 525
PROSPEED 286
1MB MOD PC2121 98
2MB MOD PC2126 150
4MB MOD PC2122 225
PROSPEED 386
2MB MOD PC3121 150
8MB MOD PC3122 429
PROSPEED 386SX
1MB MOD PC2121 99
2MB MOD PC2126 150
4MB MOD PC2122 225
PROSPEED 386SX/20
1MB MOD PC4321 80
4MB MOD PC4322 199
PROSPEED 486SX, 486SX/C
1MB MOD OP4106204 48
4MB MOD OP4106205 165
POWERMATE PORTABLE SX
2MB E-C APCH751X 199
8MB E-C APCH753-754 695
POWERMATE PORTABLE PLUS
1-3MB E-C APCH750J 178
2-3MB E-C N/A 245
3MB E-C N/A 295
POWERMATE 386/16, /20
4-16MB E-C N/A 495
8-16MB E-C N/A 625
POWERMATE SX
2MB E-C APCH855 275
4-8MB E-C APCH853 350
8MB EC N/A 495
POWERMATE SX PLUS
2MB E-C N/A 278
4-8MB E-C APC852E 378
6MB E-C N/A 578
POWERMATE SX/16
2-6MB E-C OP4108201 213
2MB KIT N/A 64
POWERMATE SX/20
2MB CPU MODULE OP4108101 172
2-8MB E-C OP410B102 213
2MB KIT N/A 64
POWERMATE SX/16I, SX/20I, SX/20VI
2MB KIT OP4108103 84
8MB KIT OP4102101 320
POWERMATE 286C, 286 PLUS
1-3MB E-C APCH250K 195
2-3MB E-C N/A 245
3MB E-C N/A 295
POWERMATE 386/20
2MB MOD APCH655E 298
8MB MOD APCH656E 698
POWERMATE 386/25, 386SX25
2MB MOD APCH655X 285
8MB MOD APCH656X 725
8MB 8MB APCH657X 725
POWERMATE 386/25S
2MB KIT OP4105201 92
4MB KIT OP4105203 174
8MB KIT OP4105202 330
POWERMATE 386/33E, 486/25E
2MB MOD OP4106101 185
POWERMATE 386/33I
1MB MOD OP4106204 62
4MB MOD OP4106205 180
16MB MOD OP4106206 680
POWERMATE 486/33I
2MB KIT DP4108103 84
8MB KIT OP4102101 295
POWERMATE EXPRESS 486/33E, /50E 486SX/20E, /25E
POWERMATE EXPRESS TOWER 486/25TE, /33TE, /50E 486/SX25TE
1MB MOD OP4106204 99
4MB MOD OP4106205 225
16MB MOD OP4106206 625
SILENTWRITER MODEL 60 & 290
2MB MOD OP4092 138
SILENTWRITER MODEL 95
2MB MOD 9502 120
SILENTWRITER MODEL 2
2MB MOD 4092 138

BROTHER

HL-4, 4V, 4PS
1MB E-C MB410 $ 125
2MB E-C MB420 165
4MB E-C MR440 245
HL-8, -8E, -8D, -8V
1MB E-C MB810 85
2MB E-C MB820 125
BROL1-410, BROL2-420
1MB KIT N/A 48
HL100V, 10PS
2MB E-C N/A 165
4MB E-C N/A 245

SHARP

PC 6220
1MB MOD CE6216 $ 99
JX9500PS LASER
1MB E-C JX95MJ 65
JX9500E, 9500H, 6700
1MB C-C N/A 129
1.5MB C-C N/A [illegible]
2.5MB C-C N/A 242
4MB C-C N/A 356

LAPTOP & NOTEBOOK

ALTIMA LAPTOP SX
1MB MOD $ 80
2MB MOD 150
4MB MOD 250
16MB MOD 2000
BONDWELL 8318 SUPERSLIM
1MB MOD 90
BONDWELL B310V-B310SX
1MB MOD 90
4MB MOD 295
CHICONY 386SX
4MB MOD 245
CHICONY 5620
4MB MOD 245
CHAPLET NOTEBOOK
2MB MOD 156
4MB MOD 240
COMMODORE C286/386LT
2MB MOD 150
COMMODORE C386
2MB MOD 156
GOLDSTAR GS520 386SX/16
4MB MOD 265
HEWLETT PACKARD 95LX
1MB MOD 205
2MB MOD 342
HYUNDAI 386SX, N8386SC
4MB MOD 245
LIBREX 286 & V386SX
2MB MOD 225
LEADING EDGE DLT/386SX
1MB MOD 85
MITSUBA NINJA 286, 386SX
4MB MOD 185
PACKARD BELL PB286NB
4MB MOD 195
PACKARD BELL PB386NBX
4MB MOD 195
POQUET
512K MOD 110
1MB MOD 205
SAMSUNG NOTEMASTER 386S-19
2MB MOD 179
4MB MOD 379
SAMSUNG NOTEMASTER 386S-20, 386S-25
2MB 189
4MB 389
6MB 403
SANYO 17NB, 18NB, 18NB9
2MB MOD 90
SAMPO NBSX19
1MB MOD 85
2MB MOD 145
4MB MOD 245
SAMPO NBSX25
2MB MOD 145
4MB MOD 245
TANDON NB386SX
1MB MOD 95
4MB MOD 280
6MB MOD 480
TANDY 15/16, 20/16, 30/16
1MB 88
TANDY 20/20, 30/20
2MB 345
6MB 575
TULIP LAPTOP
4MB MOD 245
ZEOS NOTEBOOK
2MB MOD 80

MAGNAVOX

NOTEBOOK METALIS 286, 386SX
4MB MOD 266
NOTEBOOK METALIS 386SX16 & 386SX20
2MB MOD N/A 130
4MB MOD N/A 266
HS500, 300, 386SX, 286
2MB BIT 85
4MB KIT 150
HS, PR, MX 1200, 286, HS, PR, MX 1600, MGP160 PR64CD, 386SX-16, HS, PRSX20, NS80CD 386-20SX, HS3300, 386-33 HS486, 486SX
1MB SIMM 55
4MB SIMM 175

ACER

ANYWHERE 1120NX
2MB CARD 1120NX $ 185
ANYWHERE K386B, K386S1
2MB CRD N/A 195
4MB CBD N/A 325
1100NX, 1100LS
4MB KIT N/A 150
1100/16SX
2MB KIT N/A 110
4MB KIT N/A 150
1100/20
2MB KIT 9100023006 90
1100/25, 33
4MB KIT 9100023004 150
1170, 1172, 1173, POWER 500
2MB MOD 9148623002 80
4MB MOD 9148623003 175
8MB MOD 9148623064 285
[illegible]
4MB KIT 9148623002 175
8MB IT 9148623003 285
16MB KIT 9148623004 700

LOCAL BUS MOTHER BOARDS

386/486 ONE BOARD SOLUTION
386/486-64K Cache no CPU $200
386/486-256K Cache no CPU $250

386DX-33-64K CACHE W/CPU	$199
386DX-33-256K CACHE W/CPU	249
386DX-40-64K CACHE W/CPU	210
386DX-40-256K CACHE W/CPU	260
486SX-25-64K CACHE W/CPU	349
486DX-33-64K CACHE W/CPU	490
486DX-33-256K CACHE W/CPU	540
486DX-50-256K CACHE W/CPU	749

EXPANSION BOARDS

RAMpAT!™ -Uses up to 16 MB of memory -16-bit ISA (PC AT) bus compatible -Self-installing: no switches or software setup required -Supports extended or LIM 4.0 expanded memory modes $108
RAMpAT!-Plus™ -Up to 16MB of memory -Half-card plugs into 8-bit or 16-bit ISA expansion slots-Hardware support for LIM 4.0 expanded memory-Self installing software $145
AST Rampage Plus /2MB $169

DYNAMIC RAMS

1MB X 1-100NS	3.95	256 X 1-80NS	1.80	64K X 4-120NS	1.75
1MB X 1-80NS	4.20	256K X 1-70NS	1.80	64K X 4-100NS	2.10
1MB X 1-70NS	4.25	256K X 1-60 NS	2.20	64K X 4-80NS	2.25
1MB X 1-60NS	4.70	256K X 4-100NS	4.35	64K X 1-150NS	1.50
256K X 1-150NS	1.50	256K X 4-80NS	4.45	64K X 1-120NS	1.75
256K X 1-120NS	1.55	256K X 4-70NS	4.50	64K X 1-100NS	1.95
256K X 1-100NS	1.70	256K X 4-60NS	4.75		
1 x 4-80NS DIPP	21.00				

CACHE

8 X 8-15	5.00
32 X 8-15	16.00
8 X 8-25	4.00
32 X 8-25	7.80
64 X 4-25	9.00
16 X 4-25	5.00
8 X 8-20	4.50
32 X 8-20	9.00
64 X 4-20	10.60
16 X 4-20	5.50
16 X 4-15	9.00
64 X 1-20	8.00
64 X 1-15	10.00
128 X 8-25	40.00
128 X 8-20	CALL

MasterCard VISA DISCOVER American Express
ALL CREDIT CARDS ARE VERIFIED FOR FRAUDULANT USE

FOR MEMORY PRODUCTS NOT LISTED, CALL FOR PRICES AND AVAILABILITY
PURCHASE ORDERS FROM GOVERNMENT AGENCIES - UNIVERSITIES - FORTUNE 2000 FIRMS - CALL 1-215-922-4650
NEVER A SURCHARGE ON CREDIT CARDS OPEN SATURDAY 10 – 6
ALL CREDIT CARDS ARE VERIFIED FOR FRAUDULANT USE.

TECHNICAL SUPPORT 1-215-922-4640
ORDERS ONLY TOLL FREE 1-800-457-6937
FAX 1-215-922-0116
ALL CREDIT CARDS ARE VERIFIED FOR FRAUDULANT USE.

ORDER TOLL-FREE FROM ANYWHERE IN THE USA OR CANADA. CALL FOR CURRENT PRICES AND VOLUME DISCOUNTS. PRICES AND AVAILABILITY SUBJECT TO CHANGE. ORDER LINES OPEN 6 DAYS. MINIMUM ORDER 50.00•USA SHIPPING & HANDLING: AIR $12.00–AIR OVERNIGHT $18.00–COD ADD $4.00•PA RESIDENTS ADD 7% SALES TAX•PREPAID ORDERS CALL FOR CONFIRMATION•ALL RETURNS REQUIRE RMA# AND ORIGINAL INVOICE CANCELLED ORDERS AND RETURNS FOR CREDIT SUBJECT TO 25% RESTOCKING CHARGE•RETURNED MERCHANDISE MUST BE IN NEW CONDITION AND RECEIVED WITHIN 14 DAYS FROM INVOICE DATE, SORRY, NO REFUNDS AFTER 14 DAYS, SHIPPING AND HANDLING CHARGES NOT REFUNDABLE•INTERNATIONAL ORDERS WELCOME–APO–FPO ORDERS WELCOME P.O.'S ACCEPTED FROM GOVERMENT AGENCIES/UNIVERSITIES/FORTUNE 2000 COMPANIES–SUBJECT TO APPROVAL. ALL MEMORY PRODUCTS ARE THIRD PARTY. ALL TRADEMARKS ARE THE PROPERTY OF THE RESPECTIVE OWNERS.★ ALL WORLDWIDE TECHNOLOGY PRODUCTS ARE 100% GUARANTEED AND COME WITH LIFETIME WARRANTY EXCEPT 30 DAY WARRANTY ON CPU CHIPS AND 1 YEAR WARRANTY ON MOTHER BOARDS ★

WORLDWIDE TECHNOLOGIES
437 Chestnut Street, Philadelphia, PA 19106
Customer Service 215-922-4640

Circle 238 on reader service card

Arlington Computer Products... Great Prices and Service Since 1984!

- PC Magazine "...*Arlington offers worry-free mail order purchasing!*"
- PC Sources Product Review"...*You can be confident that what you order will work as soon as it arrives!*"
- PC Computing Phantom Shopper "...*Courteous service and terrific technical support!*"

HEWLETT-PACKARD

Laserjet IV w/Toner $1389
Laserjet IIP+ w/Toner $809
Laserjet IIIP w/Toner..... $889
Laserjet IV SI w/Toner .. $3149
Laserjet 4M..... $1979
1MG Upgrade $69
2MG Upgrade $99
4MG Upgrade $149
Deskjet 500/500C $399/509
Deskjet 550C $709
Pacific Page/XL..... $269/$699
Pacific Data 25 in 1 Font . $239

Panasonic Office Automation

1124I . $269 2624 .. $359
2023 .. $199 4410 .. $599
2123 .. $229 4430 .. $859
2124 .. $299 4450I $1059
2180 .. $179 4451 . $1379
1624 .. $329 4455 . $1679
4410/4450I 2 MG...$129

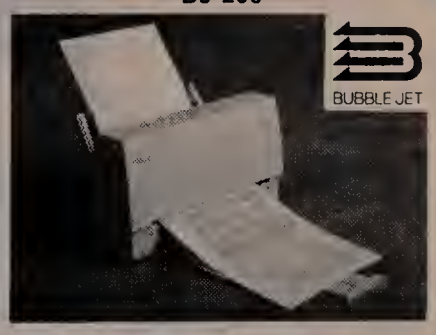
Canon

Innova Notebook 386SL-25 Mhz, 80 MG..... $1359

Canon

BJ-10EX $239
BJ-20EX $359
BJ-200 ..... $275*
BJ-300 ..... $325
BJ-300 Cart..... $19
BJ-330 ..... $489
BJC-800 ..... $1469
BJC-820 ..... $1599
LBP-4SX $669
LBP-8SX $1289

BJ-200



*After $50.00 Rebate - Until 5/30I

EPSON PRINTERS

LX810..... $169
FX870..... $259
FX1170.... $345
LQ570 .... $235
LQ870 .... $425
LQ1070 ... $339
LQ1170 ... $569
LQ2550 ... $849
EPL8000 .. $829
DFX5000.... $1259
DFX8000.... $2129
Stylus 800 .. CALL
Action 3250 .. $189
Action 1000 .. $619
Action 1500 .. $749

NO SURCHARGE FOR CHARGE CARDS!

OKIDATA

ML320 .. $299 ML393 .. $909
ML321 .. $419 3410... $1199
ML380 .. $209 OL400 .. $549
ML520 .. $369 OL810 .. $909
ML590 .. $419 OL830 . $1129
ML591 .. $569 OL850 . $1259
OL400 2MB...$129

TEXAS INST.

TM 4000/WINSX 120 .. $1949
TM4000/WINDX 120 ... $2479
TM4000/WINSX Color . $2649
LASER PS17 ..... $1029
LASER PS35 ..... $1159
LASER PS35 Turbo ... $1399

NETWORKING

Netware 2.2 5 User $479
Netware 3.11 5 User $569
Netware 3.11 10 User.. $1289
Netware 3.11 50 User.. $2599
Lantastic 10BPS Starter $449
E143 Ethernet..... $185
NE1000 Ethernet $99
NE2000 ..... $135
Ethercard +/+16 ... $119/$139
3 Com EtherLink II $185
Intel Ether 16 ..... $115
Intel Ether 16-5 Pak $479
Intel Ether 16-20 Pak .. $1759
Intel Ether EISA 32 ..... $509
Intel Token Express $479
Irma Board 3..... $399

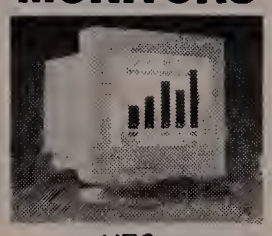
SCAN. & DIGIT.

Epson 600C..... $779
Epson 800C..... $1069
Logitech ScanMan $135
Logitech ScanMan 256 . $239
Mustek Gray Artist $159
Mustek Color Artist..... $289
Summasketch 12×12.... $259
Summasketch 12×18.... $509

NEC

P3200/3300 ..... $225/$325
P6200/6300 ..... $399/$599
P9300 ..... $825
Model 95 Pscrpt Laser . $1349
Model 95FX Laser $1649

MONITORS



NEC

3 FGX $609
4 FG..... $709
5 FG..... $1245
5 FGE $1059
6 FG..... $2249

MITSUBISHI

EGA $239
Diamond Scan 4533C .. $429
Diamond Pro 17..... $1059
HL6955 20" $1779

PANASONIC

1381 VGA 1024×768 .... $319
1395 VGA 1024×768 .... $429
1991 VGA 1280×1024 .. $1539

SAMSUNG

14" Sync Master 2..... $249
15" Sync Master 15..... $479
17" Sync Master 4..... $759

VIDEO BOARDS

ATI VGA Wonder 1MG . $139
ATI Graph Ultra + 2MG . $299
ATI Graph Prof 1 MG... $409
ATI Graph Prof 2 MG... $479
Sound Blaster Prof $169
1024 VGA 16 Bit 1 MG... $79

MODEMS

Hayes Accura 96/Fax ... $219
Hayes Accura 14.4/Fax . $245
Hayes 2400 Optima..... $119
Hayes Optima 96 ..... $309
Hayes Optima 14.4 ..... $359
Hayes Optima 14.4/Fax . $369
Hayes Ultra 96 ..... $539
Hayes Ultra 14.4 ..... $589
Practical Per. 2400 Int.... $69
Practical Per. 2400 Ext. .. $99
Practical Per. 9600 Int... $169
Practical Per. 9600 Ext. . $179
Practical Per. 14.4 Int. .. $185
Practical Per. 14.4 Ext... $199
US Robotics 9600 ..... $489
US Robotics Dual Std .. $709
US Sport 14.4 Ext. Fax . $199
US Sport 14.4 Int. Fax .. $179

intel.

SatisFAXtion MODEMS

100 2400/9600 Fax $99
200 2400 V.42/9600 Fax. $269
300 14.4/9600 Fax $275
400 14.4/14.4 Fax..... $369
400 Ext 14.4/14.4 Fax... $379
Faxability Plus/OCR.... $159

CHIPS

256K/1 MG Chips each $3/$5
256K/1MB Simms ... $15/$39
4MB Simms..... $139
Epson Action 2 MG $109
HP 2MG Upgrade $99
HP 8MG Upgrade $269
Intel ISA 2 MB $299
OKI Laser 2MB..... $129

intel.

80287-10XL/XLT $79
80387 SX-16/20/25 ..... $75
80387 SL $75
80387-16/20/25/33..... $85
Overdrive SX20/25 $309/$425
Overdrive SX33 ..... $549
Overdrive DX25/33 $425/$549

SOFTWARE

Aldus Pagemaker $489
Corel Draw $369
Lotus 123 2.4/3.1 .. $325/$389
Microsoft Excel Wndws . $299
Microsoft Windows 3.1 .. $69
Microsoft DOS 5.0..... $79
Microsoft DOS 6.0..... $69
PC Tools 8.0 ..... $119
Quicken $49
Word Perfect 5.2 ..... $259
Word Perfect Windows . $259

DRIVES & TAPES

Ext. 1.2 for PSII $159
Toshiba 3½" 1.44..... $69
Colorado Jumbo 120 ... $145
Colorado Jumbo 250 ... $199
Colorado Trakker 120 .. $339
Colorado Trakker 250 .. $395
Iomega 250 ..... $199
Irwin 120/250 ..... $169/$199
Irwin Parallel 250..... $409

AMERICAN UPS

250..... $109 600..... $259
400..... $159 900..... $375
450..... $189 1250.... $729

CD ROM OPTICAL DISKS

NEC CD Express $409
Sony CDU 535 Int. $279
Sony 7205N Ext. $455
Sound Blaster Media ... $499
Toshiba 3301 Ext. $499

SEAGATE HARD DISKS

40 MB for AT (ST251-1) $229
80 MB for AT (4096).... $299
106 MG 3120A $179
120 MG 3144A $189
245 MG 3283..... $299

PLUS HARD CARD

40 MB/50 XL ..... $299/$229
127 MB/240 MB ... $309/$519

CONNOR HARD DRIVES

120 MB/174 MB $219/249
209 MB/540 MB ... $299/$899

Arlington Computer Products, inc.

Prices and availability subject to change without notice. Purchase orders accepted from Qualified Customers.

HOURS C.S.T.
7:30 - 7:30 pm - Mon.-Fri.
9:00 - 5:00 pm - Saturday

1970 CARBOY
MT. PROSPECT, IL 60056

FOR ORDERS & QUOTES: **800-548-5105**

VISA MasterCard DISCOVER

CUSTOMER SERVICE AND IN ILLINOIS 708-228-6333
SHIPPING 708-228-9748
TECHNICAL ASSISTANCE 708-228-1470
We Export! FAX 708-228-0516

Circle 8 on reader service card

FOR OPTIMUM SOFTW
PRESS PLAY C

Put the experts to work with Software Training Videos for Windows, Excel, WordPerfect and more.

OVER 70 TITLES TO CHOOSE FROM – CALL 1-800-937-3279 EXT. 1(

Windows 3.1

Tom Sheldon guides you through the basics of Windows operation, including terminology, global commands, and starting applications. Tom also demonstrates how to use the many powerful applications and accessories including Paintbrush, Notepad, Write and more. Learn shortcuts not found in the manual, sections, on macros, PIF files, object linking to expand your knowledge.

Beginning Windows 3.1	$49.95
Windows 3.1 Applications	$49.95
Windows Adv. Tips & Tricks	$49.95
Optimizing Windows	$49.95
Combination Special Beginning, Applications, Advanced Tips & Tricks, & Optimizing Windows videos	$159.95

Tom Sheldon author of *Windows 3 Made Easy* and *Windows: The Complete Reference.*

Windows Primer Videos

See Daniel do Windows!
Teach Daniel, Teach.

Here's a video for the technically impaired. Daniel Will-Harris tenderly holds your hand through a basic understanding of Windows & how to use it's applications. It's fun to learn.

Introduction to Windows 2 hrs	$29.95
Windows Applications 90 m.	$29.95
Combination Special Both Tapes	$50.00

Daniel Will-Harris author of *WordPerfect: Desktop Publishing in Style,* and *Ventura Tips & Tricks.*

Excel 4.0

Basic instruction of Beginning, Intermediate, & Advanced tapes are taught by Dr. Robert Voss. These tapes will help the user understand the operation of this fabulous Windows spreadsheet/database program.

Beginning Excel for Windows	$49.95
Intermediate Excel for Windows	$49.95
Advanced Excel for Windows	$49.95
Combination - 3 tapes	$129.95

Robert Voss author of *Using Windows 3.1 & Using Excel 4*

Reed Jacobson, a certified Microsoft "Partner", teaches the more advanced features of Excel.

Names, Arrays, & References	$49.95
Processing Data Files	$49.95
Combination Special All five tapes	$195.95

EXCEL for WINDOWS

Lotus 123

Robin Stark leads users through the basic and advanced features of Lotus 123. Best-selling author, Judd Robbins addresses this powerful new upgrade on every level of version 2.4. Both DOS and Windows versions available.

Beginning Lotus 123 v.3.1, Win, & 2.4	$49.95
Intermediate Lotus 123 v. 2.4	$49.95
Advanced Lotus 123 v.3.1, Win, & 2.4	$49.95
Update from DOS to Lotus for Windows	$49.95
Combination Special 2 tapes - Beginning & Advanced v. 3.1 or Windows	$89.95

Robin Stark University of California training specialist and author of *The Encyclopedia of Lotus 123*

LearnKey™

3 EASY WAYS TO ORDER

Major Credit Cards Accepted: For your convenience we accept Visa, MasterCard, or American Express call 1-800-937-3279. Please have card available.
Purchase Order: FAX or mail an authorized PO. Your order will be processed the same day as received with Credit Card guarantee.
Check or Money Order: Business Checks and Money Orders are shipped same day. Personal Checks please allow 2 weeks to clear.
When ordering please include: Video titles and quantities desired, shipping and billing address, phone #, version needed & computer diskette size.
Shipping: For USA orders include the following shipping charges: UPS Ground $5.00, UPS Blue $8.00, Overnight $20.00, Regular U.S. Mail or Canada $8.00. Additional charges for International shipping. Utah residents add 6.25% sales tax.

FAX or mail orders to:
LearnKey, Inc.
93 S. Mountain Way Dr. Rm. 10
Orem, UT 84058
Phone 801-224-8210
FAX 801-224-8211

ARE PERFORMANCE-
N YOUR VCR!

Other Software Training Videos Available from LearnKey

WordPerfect Videos

Learning WordPerfect couldn't be easier! Karen Acerson, Carolyn Dillon, and Daniel Will-Harris are the expert instructors of this popular and powerful software. These tapes are a great addition to any training program. DOS and Windows versions available.

Beginning WordPerfect 5.1	$49.95
Interm. WP for Windows	$49.95
Advanced WordPerfect	$49.95
WordPerfect Update (DOS)	$49.95
WordPerfect Tips & Tricks	$49.95
WordPerfect Macro Magic	$49.95
Perfecting the Office	$49.95
WordPerfect DTP	$49.95

Combination Special $280.00
Includes: 7 Videos
❑ DOS or ❑ Windows

Karen Acerson
author of *WordPerfect: The Complete Reference* and *WordPerfect: From 5.0 to 5.1.*

DOS Videos

Supercharging DOS	
Applications under Windows	$49.95
Discover DOS	$49.95
Using DOS 5.0	$49.95

Daniel Will-Harris Graphics Videos

Corel Draw 3.0 Publication Design & Production	$59.95
Corel Draw 3.0 Special FX	$59.95
Ventura Publisher	$59.95
Ami Pro Desktop Publishing	$59.95
Word Desktop Publishing	$59.95

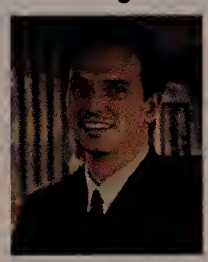
Netware 3.X

Tim Gendreau, Certified NetWare Level II instructor takes you from the basics of networking to advanced security techniques.

NetWare Basics 70 Min.	$125
Setting-up NetWare Security 66 Min.	$125
Menu & File Server Utilities I 106 Min.	$125
Menu & File Server Utilities 2 67 Min.	$125
NetWare Printing 83 Min.	$125
Login Scripts 74 Min.	$125
Custom Menus 33 Min.	$125

Combination Special $695.00
Includes: 7 Videos

NetWare 3.X Installation 69 Min.	$125
Installing WP on a Network 101 Min.	$125



Tim Gendreau
Certified NetWare Level II instructor has taught hundreds of professionals the features & power of NetWare.

LANtastic Videos

Getting Started 50 Min.	$59.95
Management & Security 30 Min.	$59.95
Server Config. & Perf. 60 Min.	$59.95
Network Printing 35 Min.	$59.95
Networking Windows 60 Min.	$59.95

Combination Special $240.00
All Five LANtastic Series tapes

Mike Montgomery
author of *Networking with LANtastic*

Harvard Graphics

Mike McClure teaches basic and advanced techniques for creating powerful Harvard Graphics presentations. DOS 3.0 & Windows 1.1 Versions

Beginning Harvard Graphics	$59.95
Advanced Harvard Graphics	$59.95

Mike McClure
Harvard Graphics expert designer and master teacher.

WordPerfect Legal Series

Carolyn Dillon

Carolyn Dillon teaches basic and advanced WordPerfect 5.1 techniques that will help any legal office become more efficient. 2 hrs. each

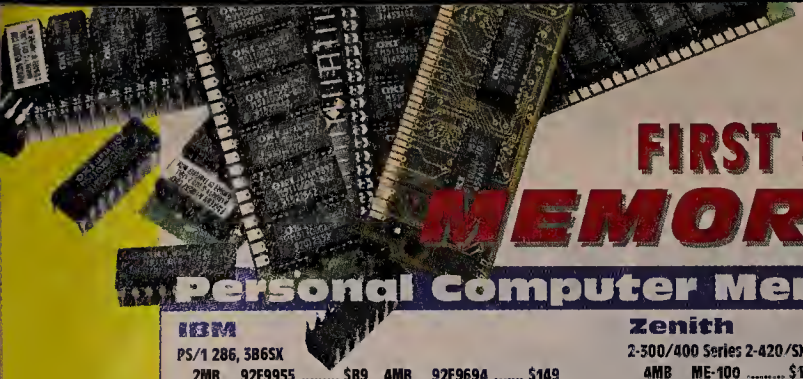
Legal Office Basics	$59.95
Legal Short Cuts	$59.95
Document Assembly	$59.95
Building a Forms Library	$59.95

Combination Special $195.00
Includes all 4 Videos
20% off regular price

Learn FROM THE Experts

1-800-937-3279 EXT.10

Circle 206 on reader service card



FIRST SOURCE INTERNATIONAL PRESENTS
MEMORY AND MUCH MORE...

Personal Computer Memory

IBM

PS/1 286, 386SX
2MB 92F9955 ..... $89 4MB 92F9694 ..... $149
PS/1 Consultant, Essential & Expert models m43, m44 & PS/Valuepoint all models except Cxx series
4MB PN NA ..... $159 16MB PN NA $579
PS/2 25/286, 50/2B6, & memory adapter 1497259
2MB Kit 50F5560 ..... $79
PS/2 55SX; LS, 40SX, 502, 55SX; LS, 65SX; LS, 70, & XStation
1MB 6450603 ..... $49 2MB 6450604 ..... $79
PS/2 70-A21; A61; B21; B61, PS/1 Consultant, Essential & Expert models x11, m13 & m14, PS/Valuepoint Cxx series
2MB 6450608 ..... $79
PS/2 35SX; LS, 40SX, 55SX; LS, 65SX; LS, XStation, PS/Valuepoint Cxx series & adapter board 34F3011 or 54F3077
4MB 34F2955 or 87F9977 ..... $149
PS/2 35SX; LS, 40SX, PS/Valuepoint Cxx series
8MB 6450129 ..... $299
PS/2 90 XP, 95 XP, P75 (pairs), 56, 57 (all), PS/1 Pro M2123
2MB 6450902 ..... $89
PS/2 90 XP, 95 XP, P75, 56, 57 (all), PS/1 Consultant, Essential & Expert models m11, x15 & x14, PS/1 Pro M2125
RS/6000 POWERstation/POWERserver 220 series
4MB 6450128 ..... $149 8MB 6450130 ..... $299
Expansion boards for 50, 502, 55SX, 60, 65SX
2-8MB w/2MB 1497259 ..... $269
Expansion boards for all models 70 & 80
2-14MB w/2MB 34F3077 ..... $529

Compaq

ProLinea 3/25s; 5/25zs
2MB 141738-001 .... $89 8MB 141742-001 .. $289
ProLinea 4/25s, 4/33, 4/30
1MB 141682-001 .... $55 2MB 141683-001 .... $89
4MB 141684-001 .. $159 8MB 141685-001 .. $309
DeskPro 386-20, 20e & 25
4MB Module 113152-001 ..... $179
DeskPro 386s/16
4MB Module 112534-001 ..... $179
DeskPro I series, 286N; 386N; 386SX/20; 20N
SystemPro LT Series, ProSignia PC Server 486/33; DX2/66
Portable 486c & M Series expansion boards
4MB 118690-001 ... $155 8MB 112877-001 ... $315
ProSignia PC Server 486/33; DX2/66
16MB 149320-001 .. $999 32MB 149147-001 . $2439
SystemPro XL (486-50)
16MB 136816-001 .. $799 32MB 136817-001 . $1599
DeskPro 386-35, 486-33, & SystemPro
2MB 115144-001 .... $99 8MB 116561-001 ... $289

DELL

Power Desktop 325D, 325P, 355D, 355P, 435P, 486P & 486D
1MB 310-2505 ..... $59 4MB 510-2507 ..... $149
PowerLine Workstation 420; 25; 35; 50; 4500E/2 & 4660E
2MB 310-2466 ..... $99 4MB 310-2467 ..... $179
8MB 310-2468 ..... $319 16MB 510-2469 ..... $629

Zenith

2-300/400 Series 2-420/SX, 2-425/SX, 2-433/DX, Z-433/SX
4MB ME-100 ..... $159 16MB ME-90 ..... $599
Z-Server 425SE, 433OE, 450DE
4MB ME-452 ..... $169 8MB ME-102 ..... $319
2-Station 325Sh; Sn, 420SEh; Sh; Sn; 25Sh; 330eh; Dh; 50XEn
1MB ME-70 ..... $49 4MB ME-100 ..... $149
Zenith 2-586/20; 25; 53 & 33E
1MB ZA3800ME ..... $49 4MB ZA3800MK $149
Zenith Z-386SX/20, 286LP+, 2-LS
2MB Kit 2-60S-1 ..... $89
Zenith 486/33ET; 25E
4MB ZA4200M2 ..... $189 16MB ZA4200M8 ..... $619

AST

Bravo 3/25s
2MB 500710-004 .... $99 8MB 500824-002 .. $319
Advantage! Plus 486DX/33; DX2-50; DX2-66
4MB 500510-008 .. $179 8MB 500824-001 .. $319
Advantage! 386SX/20; 25, Advantage! Pro SX/25, Bravo 3/33s
2MB 500962-001 .... $75 8MB 500962-002 .. $359
Advantage! Pro 486DX/33; SX/25, Bravo LC 4/25s; 35; 33s; 50d; 66d
4MB 500987-002 .. $139 16MB 500987-004 . $499
Premium 386/25; 33; 33T, Premium II 386SX/16; 20; 25
1MB w/WPB 500780-005; 002 ..... $59
Advantage! 486/25; 33; 33p; SX20, Bravo 4/33; 25; Premium 4/25; 33TE, Server SE 4/35
2MB w/WPB 500718-004; 780-005 ..... $119
Premium 386/33T, 586SX/16, Premium II 386SX/20; 25
4MB w/WPB 500780-004 ..... $159
Advantage! 486/25; 33; 33p; SX20, Power Premium 3/33; 33; 33s, 4/50d; 66d, Premium 386/33TE, 486/25; 25E; 25TE; 53; 33E; 33TE, Premium II 386/25; 33, 486/33; SX/20
Premium Server SE 4/35
8MB w/WPB 500780-001 ..... $289

Hewlett-Packard

Vectra QS/16S; 20PC, RS/20; 20C; 25, 25C
4MB Kit 01542 or 1642A $169
Vectra 386/16N, 386/20N, 386/25N PC
2MB 02406A ..... $79 8MB 02404A $279
Vectra 486PC; 486/25T; 486/33T; 486s/20; 486/25N; 486/33N; 486/30N; 486/66N
2MB 02381A ..... $89 8MB D2152A $309
Vectra 386/25; 486/25U; 486/33U; 486/50U; 486/66U
2MB 02581A ..... $89 8MB 02152A $509
Vectra 486/25N; 486/35N; 486/50N; 486/66N
16MB 02676A $579

NEC

PowerMate 286/12; SX/16 & SX/20
2MB Kit OP-410-8105 ..... $99
PowerMate 586SX/20i; 20vi; 16i; 25i; 486/50i; 486/33i
8MB Kit OP-410-2101 ..... $279
PowerMate 586/33E & 486/25E
2MB OP-410-5101 ..... $199

Laptop & Notebook Memory

AST

PowerExec 5/25SL, 3/25SL-C and EL 4MB $179
8MB $649
16MB $1249
Premium Exec 286, 386SX/20; 25; 25C 4MB $129

Compaq

Contura 3/20, 3/25, 3/25c 4MB $169
8MB $509
LTE 586S/20 4MB $189
LTE Lite 20; 25; 25c, 25e 4MB $159
8MB $359
16MB $1299
LTE Lite 4/25c 4MB $219
8MB $359
SLT 286 4MB $259
SLT 386s/20 4MB $179

IBM

ThinkPad 300 2MB $159
8MB $429
PS/2 CL57SX, ThinkPad 700 and 700C 4MB $219
8MB $569
NS1 Notebook (All) 2MB $179
4MB $249
L40SX, N33SX and PS/Note 182 4MB $135
L40SX and PS/Note 182 8MB $285
PS/Note N45SL 2MB $136

NEC

UltraLite & Cellular Workstation 286F 4MB $369
UltraLite & Cellular Workstation SX/20 2MB $179
8MB $593
UltraLite III, SL/25C 2MB $119
4MB $199
UltraLite SL/20, SL/20P 2MB $119
6MB $289

Texas Instruments

TravelMate 5000 (all models) 2MB $79
TravelMate 4000 (all models) 4MB $199
TravelMate WinSLC/25 2MB $79

Toshiba

T1000SE/LE/XE; 2000, 2000SX; SXe, T2200SX and T1800 Satellite Series 2MB $79
4MB $159
8MB $289
T1200XE, 1600, and 5100E 2MB $89
T3100SX, 5200SX, and SXC 2MB $89
4MB $149
T3200 5MB $149
T3300SL 4MB $169
8MB $469
16MB $815
T4400 and T6400 (all models) 4MB $169
8MB $509
16MB $615
T5100 2MB $89
T5400, T5200; T5200C and T8500 2MB $89
8MB $279

Zenith

2-Note 320L, 520Lb, 525L, 325Lc 2MB $169
8MB $369
2-Sport 420S, 425S 4MB $189
Z-Sport 325S 2-6MB $159
4MB $249
MastersPort 586SL, SLC, Sle 2MB $99
MastersPort 386SX 2MB $109
SupersPort SX; 286e; SlimsPort 2MB $139
SupersPort 286e; SlimsPort 4MB $279

We also carry a large inventory of memory upgrades for other name brand laptop and notebook systems. Please contact our sales staff for information on your specific model.

Laser Memory

Hewlett Packard LaserJet IIIsi, 4, 4M & XL300
4MB C2065A ..... $149 8MB C2066A $299
Hewlett-Packard LaserJet IIP, III, IIIP, IIID
2MB 33475B ..... $99 4MB 35477B $159
Hewlett-Packard LaserJet II & IID
2MB 53444B ..... $99 4MB 35445B $159
IBM Laser 4029 All Models
4MB 1183335 ..... $129
Canon LBP-4, 4Lite, 4Plus
1MB 563-2250 ..... $119 2MB N/A $169
Canon LBP-III & 8III Plus
2MB 565-2350 ..... $249 3MB 563-2360 ..... $299

CPU Upgrades

Upgrade your system to 386 or 486 power!

Kingston processor upgrades improve the performance of DOS 5.0, Windows, OS/2 and other business, graphic and CAD/CAM programs without purchasing a new system, look to Kingston Technology!

SX/Now!
25MHz (SX) ..... $199 33MHz (SX) $219
SLC/Now!
20MHz (SLC) ..... $129 33MHz (SLC) $219
50MHz (SLC) $399
486/Now!
25MHz (SX) ..... $429 33MHz (DX) $639
MicroMASTER
25MHz (SX) ..... $829 33MHz (DX) $1299
With 4MB add ..... $149 With 8MB add $289
ATMaster
25MHz (SX) ..... $999 33MHz (DX) $1439
With 4MB add ..... $149 With 8MB add $289

Fax Modems

COMPUTER PERIPHERALS, INC.

PC Magazine says, "The ViVa's data-transfer performance was excellent!"
PC Magazine December 8, 1992

ViVa Internal Modems
14,400bps V.52/V.42 modem, send & receive FAX .. $219
24/9600bps with send/receive FAX $89
ViVa External Modems
14,400bps V.52/V.42 modem, send & receive FAX .. $279
24/9600bps with send/receive FAX $95

MHz Megahertz CORPORATION

For AST, Compaq, IBM, Sharp, TI, Toshiba, Zenith and many other Laptop and Notebook Systems.

PCMCIA 2.0 Internal FAX/Modems
14,400bps FAX/Modem, Autosync $495
24/9600bps FAX/Modem $295
Internal FAX/Modems w/MNP-5 & V.42/V.42bis
14,400bps FAX/Modem, Autosync $499
24/9600bps FAX/Modem $219
External Pocket Modems for any RS-232 Serial Port
14,400bps FAX/Modem, Autosync $379
24/9600bps FAX/Modem $189

Video Cards

Diamond Computer
Stealth Pro 1MB ..... $249 Stealth Pro 2MB $359
Stealth 24 1MB ..... $169 SpeedStar 24X 1MB ... $159
Viper VLB 1MB ..... $319 Viper VLB 2MB $409
Stealth VLB 1MB ..... $249 Stealth VLB 2MB $369
We also carry ATI, Number Nine and Metheus cards.

SIMM Modules

Industry Standard 30-pin SIMMs
1MB x 9-70 or 80ns, Fast Page Mode $35
4MB n 9 70 or 80ns, Fast Page Mode $129
36-Bit, 72-Pin SIMMs
512K x 36-70 or 80ns (2MB) $79
1MB x 36-70 or 80ns (4MB) $149
2MB n 36-70 or 80ns (8MB) $289

30 day Money Back Guarantee
Buy with confidence!

- 100% compatible in form, fit, & function
- All products user installable
- Installation instructions included
- Toll-free technical support
- Thousands of items in stock
- Manufacturer's warranties
- Corporate PO's, APO/FPO's welcome
- Government and Educational pricing
- International orders welcome
- Special volume pricing
- 24-hour fax line
- Same day shipping
- Overnight delivery available
- No surcharge on credit cards

CALL FOR ANY MEMORY UPGRADE NOT LISTED!

We stock upgrades for over 1700 computers and printers

TOLL FREE FROM THE UNITED STATES AND CANADA
800/647-9866

INTERNATIONAL
714/588-9866

FACSIMILE
714/588-9872

Business hours:
Monday - Friday, 8am-5pm, P.S.T.
Saturday, 9am-3pm, *ORDERS ONLY*

The Only Source for Computer Upgrades
First Source International

Mail or fax orders to:
First Source International, Inc.
7 Journey
Aliso Viejo, CA 92656

Terms and Conditions: Memory products are third party, manufacturer's numbers are for your convenience. Freight charges are non-refundable. A RMA number is required for all returns. All non-defective returns, unopened, refused, or cancelled orders, will be subject to a 20% restocking fee. Prices and availability are subject to change without notice. Purchase prices at the time of order are final. First Source International cannot be responsible for errors in typography or photography. We will beat any advertised price valid only on identical brands, offer not good for SIMMs or DRAM. Trademarks and registered trademarks are of their respective companies.

We'll meet or beat any advertised price!

CALL THE UPGRADE EXPERTS TOLL FREE 800/647-9866

L0693

The Bottom Line: Keep It Simple, Smarty

An animated character in the dazzling tutorial for *Improv* says, "There's only one problem to solve. Calculating the bottom line." *Improv*, Lotus's ingenious reinvention of the spreadsheet, eliminates the complexities of spreadsheet life. *Guide Line*, Symantec's answer to the obscurities of project management software, is also easy to use. Autodesk's *Office Layout* package greatly simplifies the management of office space and furnishings. And the trackball on PC Brand's new LeaderBook Pro is simply *mahvelous!* (So's the color monitor.)

The bottom line? Each product promises to increase my productivity by making things less complicated.

Improv for Windows

Improv is so simple to use, it's surprising no one thought of it before. More than just a reinvention of the spreadsheet, *Improv* gives you a new way to handle and manipulate data. If you deal with numbers at all—especially if you've never used a spreadsheet program—you will want *Improv*.

Yes, there are still rows, columns, and cells in a ledger-sheet-like layout. But that's where the resemblance to your average spreadsheet ends. All cells are named in English, and you refer to the data they contain by the name of the cell or item. An item can be named "miles per gallon," and you can assign a formula to it, also in English—for example, "miles per gallon = miles/gallons" instead of "A1=B1/C1."

You can locate formula or logic errors by reading your own words, not obscure cell references. What's more, being able to track the links among your numbers with plain English means you're likely to think more logically about how your figures are laid out and how they should be calculated and interpreted. All the calculations used on a given worksheet are shown in a scrolling display at the bottom of your screen.

Improv will allow you to manipulate your worksheet in almost every conceivable way. It lets you drag items around the sheet wherever you want without losing the relationships among them. You can apply the same formula to multiple item locations with just a couple of mouse clicks: There's no retyping, no copying.

Learning to use *Improv* is a delight, thanks to the interactive tutorial that serves as an introduction to the program. *Improv*'s tutorial is the most impressive graphical demonstration I have seen on a PC.

Such software power, of course, must be matched with hardware: At minimum, *Improv* requires a 20-MHz 386 PC with 4MB RAM (Lotus recommends a 33-MHz 386 with 6MB RAM), a VGA monitor, and a mouse. If you haven't upgraded to this kind of horsepower yet, *Improv*'s simplicity and dynamic display powers will make you happy to do so. *Improv*'s list price is $495, but you should look for introductory offers. Most assuredly, *Improv* is a Foulks Favorite.

Guide Line and Guide Line Maker

A couple of years ago, when I attempted to use a project management program, I got stumped on one of the first questions: Did I want a Gantt chart or a PERT chart? I knew that either would let me see the entire project in chart form, but I didn't know which one I wanted, and the software wouldn't let me proceed until I chose. Talk about frustrating. All I wanted was a schedule—I didn't want a college degree in scheduling.

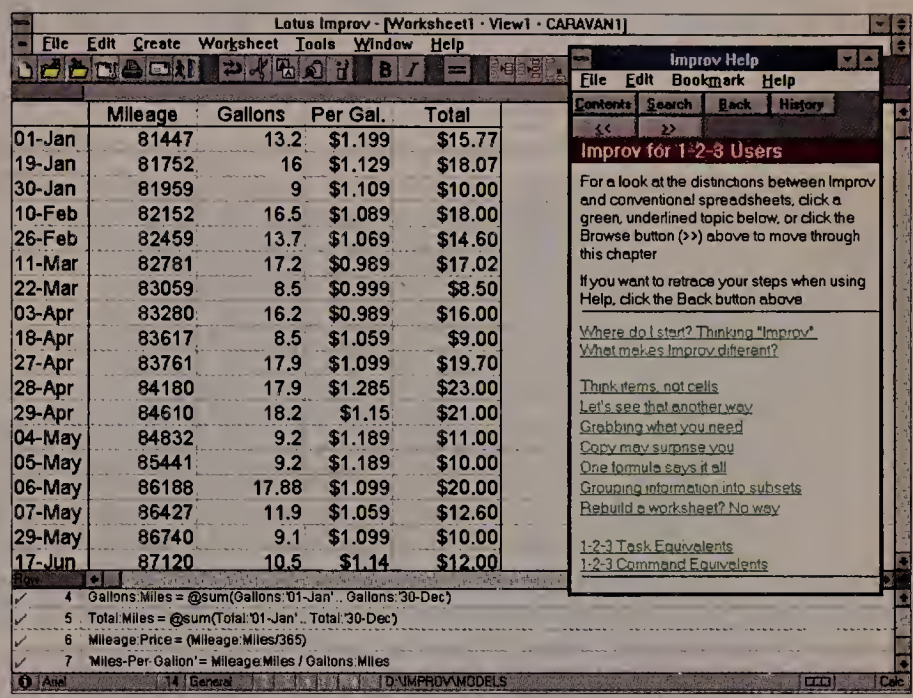
Symantec is seeking to change that situation by introducing two new products that work as front ends to any of four popular project management packages: Symantec's *Time Line 1.0 for Windows*, *Time Line 5.0 for DOS*, *On Target*, and Microsoft's *Project for Windows*.

The $149.95 *Guide Line* is a package of 16 ready-to-use guides for common projects, such as putting together a marketing plan, setting up a network, or relocating an office. *Guide Line* can be purchased alone and is bundled with the $699 *Time Line for Windows*.

The $499 *Guide Line Maker* is a project development tool that helps you build other more specific guideline project models. When you use either product with a project management package, you can develop a full-blown project schedule that displays all the resources, time dependencies, and charts you need.

Using a LAN installation guideline, I developed a workable Gantt chart installation schedule for a ten-station local area network in about 15 minutes.

Foulks's Favorite is Improv, Lotus's brand-new approach to spreadsheets.



By Thom Foulks

The *Guide Line* template asks you questions—in this case, how many workstations, length of the cable, and so on—with predictable options to be checked if you want to include them. *Guide Line* then produces a template file. To build a complete schedule, you must feed the file into one of four project management packages *Guide Line* supports. You can also import an existing project management schedule and convert it to a template for distribution.

Office Layout

Using a CAD (computer-aided design) product to lay out an office floor plan isn't a new idea, but drawing a symbol for every stick of furniture is tedious. Autodesk makes this otherwise complicated project a lot easier with a specialized $149 version of its top-drawer *Generic CAD* program. *Office Layout* has a greatly simplified user interface, predrawn office equipment symbols, and an equipment inventory system.

You start by drawing your office walls, using a crossbar cursor to indicate their location, with a real-time display of your layout's dimensions. *Office Layout* knows how to draw doors and their swing paths—just point to a door's location and choose its width. Then you select from more than 200 office object symbols—chairs, desks, desktop equipment, and portable partitions—experimenting with their placement on screen. I've already begun looking at various redesigns of my office.

The inventory system is particularly useful and gives *Office Layout* an edge over regular draw programs in creating floor plans. As you choose and rearrange symbols in your office design, you also specify size, price, occupant, and so on, so that your plan holds the data for inventory summaries automatically. That data can be exported to *Improv* or any other spreadsheet program.

Although *Office Layout* gives you highly graphical representations with on-screen display measurements that go all the way down to 1/16 inch, it does not use the *Windows* interface. That, according to the Autodesk folks, means *Office Layout* can run on an XT equipped with a hard drive and a graphics card. (I looked at the product on my 33-MHz 386 machine with 8MB RAM, so screen response was impressively snappy and crisp, even on zooms to desk-drawer detail.)

486/SX Dual Scan Color LeaderBook Pro

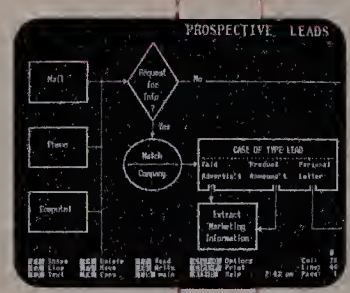
Evaluation units of notebook computers have wandered in—and out—of my office for months, and all have lacked one critical

ARE YOU SPENDING TOO MUCH TIME DRAWING FLOWCHARTS?

YOU NEED FLOW CHARTING™ 3.

Every day, professionals worldwide save time and money using Flow Charting 3. It's fast, efficient, easy to use, and always produces presentation-perfect charts and diagrams.

With Flow Charting 3's built-in flexibility, you can create customized charts using a variety of shapes, lines, and text—placed where you want them.



Plus, Flow Charting 3 is now available in a LAN version. Making it easy to share files and set up work groups for specific projects.

And it's backed with free technical support and a 90-day no-risk guarantee. So if you're spending too much time drawing charts, call for a free demo and see for yourself what makes Flow Charting 3 the best-selling flowcharting software.

See your dealer today! Or for a free interactive demo disk,call 1-800-525-0082, ext. 252
International: 408-778-6557, ext. 252

Novell is a registered trademark of Novell, Inc.

PATTON & PATTON
Software Corporation

Excellence in charting the flow of ideas!

Patton & Patton Software Corp. 485 Cochrane Circle, Morgan Hill, CA 95037

Circle 233 on reader service card

POWER TIP no. 288

Creative Comments in WordPerfect for Windows

If you want multiple paragraphs in a *WordPerfect for Windows* comment, don't create the comment in the comment dialog box. Instead, type it in as normal text in the document area. When complete, block the comment and select Tools • Comment • Create. The highlighted text will become a comment, but one with hard returns.

George Salvador
Houston, Texas

YOU PURCHASED A CD ROM DRIVE TO EXPLORE NEW FRONTIERS ...

WHY NOT START WITH THE LAST TWO.

SPACE

A visual history of manned space flight, this CD ROM contains mission profiles, time lines, and histories by acclaimed author Anthony R. Curtis. Also included are 450 megabytes of narrated QuickTime™ movies on such programs as Mercury, Gemini, Apollo moon launches, the Shuttle program, and Space Station Freedom. Special sections cover topics such as space-based science experiments, spacewalks, and life in zero gravity. Macintosh and Windows versions available. $49.95

OCEANLIFE

Navigate the life-filled reefs of the southwestern Pacific and discover more than 40 species of exotic tropical fish native to the islands of Fiji, Tonga and Vanuatu. Ocean Life is a QuickTime-based field guide, complete with movies, text, and maps. Based on the field work of Robert F. Myers Ph.D. As a bonus we have included the original high resolution QuickTime files for use in your own presentations. Macintosh and Windows versions available. $39.95

SUMERIA

For more information or for mail orders, direct your requests to: **Sumeria, Inc., 329 Bryant Street, Suite 3D, San Francisco, CA 94107.**

All orders payable in U.S. dollars. Add $2.50 per CD for shipping and handling. Foreign orders add $5 per CD for shipping and handling.

For phone orders please have your Visa or Mastercard ready. Fax orders can be made by calling 415.904.0888. California residents add applicable sales tax. Please allow 4 to 6 weeks for delivery.

To Order, Call 415.904.0889

All product names are trademarks or registered trademarks of their respective owners. © 1993 Sumeria, Inc.

Circle 246 on reader service card

element: a functional pointing device. I've been desperate for something to use instead of a mouse, especially when I'm cruising at 35,000 feet or I'm in a cab that's stuck in traffic. My lean-and-mean mobile work style rules out any of those plug-in, cable-dangling, clamp-on units. So far, all the built-in pointing devices I've ever tried have been too small, with tendencies to jiggle and overspin.

Just when I was about to give up, enter PC Brand with the 486/SX Dual Scan Color LeaderBook Pro. The 6.6-pound portable LeaderBook Pro has a solid, comfortable, centrally mounted trackball that can be manipulated by either hand, or both if you so desire. (Imitation remains the most sincere form of flattery: PC Brand freely admits that the broad platform that holds the trackball was "borrowed" from Apple Computer's highly successful PowerBook series of portables.)

Also lacking in many portables is a screen that doesn't strain your eyes. PC Brand's "dual scan" LCD scores again. Its passive-matrix design makes two simultaneous vertical sweeps across the 9.5-inch diagonal surface. The company says this produces a 20-to-1 contrast ratio rather than the 13-to-1 ratio common to most other passive-matrix designs: The result is a brighter picture. The colorful screen is indeed quite comfortable to view in room light, so you don't have to squint.

My unit, complete with 4MB RAM and a 120MB hard disk, carries a $2595 price tag. A 2400/9600-bps fax-modem is available for $199, and a proprietary 4MB RAM expansion module costs $300. (Monochrome models of the LeaderBook Pro series are priced as low as $1795.) I'd be happy to pay that just for the trackball.

- **Guide Line, Guide Line Maker** Symantec Corp.; 800/441-7234, 408/253-9600
  Reader service no. 712
- **Improv for Windows Release 2.0** Lotus Development Corp.; 617/577-8500
  Reader service no. 713
- **Office Layout 1.0** Autodesk Retail Products; 800/228-3601
  Reader service no. 714
- **486/SX Dual Scan Color LeaderBook Pro** PC Brand Inc.; 800/722-7263
  Reader service no. 715

Thom Foulks is a contributing editor for PC World.

COMING IN JULY! **PC World Special Report**

Business Traveler's Guide to Mobile Computing

Our editors have been on the road again, preparing a special 20-page 'hands-on' report on the realities of Mobile Computing for business travelers. In it, you'll find these valuable articles:

- *PC World* examines the 'air-go-nomics' of using notebook computers aloft.
- Buyer's Guide to 22 notebook computers you *can* take with you.
- A survival guide with tips for successful computing 'on the road' in hotels, airports and other offices.

Don't miss this important section!

PC World – July issue

PC WORLD

POWER TIP no. 289

Faster Finds in Excel

***Excel*'s Formula • Find feature helps you find a string in a worksheet. But if you're looking for the right instance of that string, calling up Formula • Find over and over, even with the <Shift>-<F5> hot key, can be a drag. In these cases, Formula • Replace is a lot quicker. Just type the string into the Find What box and click Find Next. If the first find isn't what you're looking for, click Find Next again. Just don't click Replace or Replace All. When you find the cell you want, click Close.**

Rex Farrance
Associate Editor

CACHE ROM C&T 286 IPX DRIVERS UMB 386MAX **QUALITAS**® BLUEMAX 486SX BUFFERS MODEMS EGA BIOS

When running DOS applications in Windows, is there something you're running out of?

Introducing 386MAX Version 7.

If you use DOS applications under Windows, you know how quickly memory gets used up. Which is why you should explore new 386MAX® Version 7, the most effective memory manager in the universe.

That's because new 386MAX is so well integrated with the workings of DOS, you actually get better, more flexible DOS under Windows than with DOS alone. Including up to 736K of conventional memory in each DOS session thanks to our powerful new Windows features. That's 100K more than you'll get even with the improved memory management built into new DOS 6. Plus, new 386MAX makes it easy to get top performance from each DOS application in Windows by guiding you effortlessly to the optimum configuration for your system.

We even make DOS itself better, especially if you move to new DOS 6. By freeing up extra memory for applications, and for using more of the 200K of the built-in DOS 6 utilities. By giving you more intelligent, more automated memory management features, including new QMT, the easy, reliable way to test the integrity of your memory.

And by providing new MultiConfig Maximize which, unlike DOS 6, ensures fully optimized memory in a number of different boot configurations.

So if you're looking for a memory manager that really shines, there's no need to search the galaxies. Instead, get new 386MAX 7 for any 386, 486 or Pentium™-based PC for just $99.95. Or get BlueMAX™ 7 for genuine IBM brand PCs at just $124.95.

Call toll-free today to order direct, or for our special limited time $29.95* memory manager upgrade offer. 1-800-473-0486.

The Intelligent Memory Manager™

Circle 236 on reader service card

BLUEMAX 386 486SX EGA DRIVERS 486 C&T 286 DOS 5.0 HMA WINDOWS VGA MOUSE DPMI BIOS HIGH DOS TSRs NETWORKS XMS INITIALIZE RAM FAX BOARD

MEMORY TSRs MOUSE XMS HIGH DOS EGA INITIALIZE HMA WINDOWS 640K NETWORKS 386SX PAGEFRAME CACHE LIM EMS DPMI CD ROMS UMB 386MAX RAM

RAM PAGEFRAME BIOS MEMORY VGA MOUSE TSRs HIGH DOS EGA INITIALIZE DPMI MODEMS 640K FAX BOARD 386SX

1993 ANNUAL WINDOWS 100 W MAGAZINE WIN AWARD

yes It runs with NetWare

© *1993 Qualitas.* Qualitas, 7101 Wisconsin Avenue, Suite 1386, Bethesda, MD 20814. *All company and product names are trademarks or registered trademarks of their respective owners.* **System requirements: Any 386, 486, or Pentium micro-processor based PC or PS/2, min. 256KB of extended memory, DOS 3.3 or higher, high density floppy disk or hard disk drive.** **plus $6.95 shipping & handling in continental U.S.*

Flowcharting

Easier and Faster than *ever* before!

HavenTree has cranked up the power on **EasyFlow** with a release that lets you **create your own shapes**, offers a host of **new text handling features**, exports charts in a wider variety of graphics formats **than any other flowcharting program** and **supports more printers and plotters** than any other DOS-based competitor. We've even given our already highly **intelligent line router** an IQ boost. These **new and improved** features, combined with those listed below, make EasyFlow the **World's #1 flowcharter.**

- *Create new shapes or modify existing ones.*
- *Automatic off-page connectors and adjacent-page mapping help make complex charts easier to read.*
- *Automatic page borders and numbering.*
- *Automatic text formatting.*
- *Context-sensitive help.*
- *Support for LIM expanded memory.*
- *Runs on your network.*
- *Exports charts to ASCII, CGM, DXF, EPS, GEM, PCX, HPGL, SYM, TIFF and WPG file formats.*
- *Charts compatible with EasyFlow Mac version.*
- *Improved color output - HP DeskJet 500C, HP PaintJet, Epson LQ2550.*
- *Tutorial included.*

Introducing EasyFlow 8.0 (for DOS)

EasyFlow is also available for the Mac

See your dealer today or call now:

1-800-267-0668 *ext.47*

(In Canada: 613-544-6035)

HavenTree SOFTWARE

HavenTree Software Limited P.O. Box 470-M Fineview, NY 13640-0470
AD0007-930107

Distributed by Micro Central & Merisel

Circle 179 on reader service card

Underground, in a Maze, and on the Green

The popular *Ultima* fantasy series has gone underground. No, you don't have to lurk around the bus station to buy the latest version. Adventurers continue to roam the highways and villages of Britannia in *Ultima VII—The Black Gate* (reviewed here in January). But would-be wizards and coffee-break sword fighters get an opportunity to explore the subterranean depths with *Underworld II—Labyrinth of Worlds.*

The plot? Okay, you've saved Britannia eight times already, but suddenly a huge black-rock gem encases the castle of Lord British, and the hapless deadbeats who live there need you to beat back the bad guys one more time. You find yourself exploring dark corridors, gathering spell-casting runes and magic potions, wielding medieval weaponry and armor, and enjoying stylized conversations with seers, sorceresses, and sidekicks. The scope of this adventure is astonishing. Each of the eight facets of the black-rock gem opens onto a different plane of reality: prison towers, ice caverns, distant cities, exotic worlds, and alien dimensions.

Underworld II employs a distinctly different graphical approach, too. Instead of the familiar spy-eye viewing angle where you float just over someone's head, you see *Underworld* from the hero's or heroine's point of view.

A well-designed, mouse-based interface lets you move through the dungeons as smoothly as if you were walking. Simply swing your cursor to the side to change directions, or raise it toward the top of the screen to run faster. And you can throw away that graph paper, courtesy of an auto-map that records your explorations automatically. Combat is equally intuitive. Aim your weapon with the mouse, hold down the right button to gather power, and release the button to thrust or parry.

By Michael Goodwin

On-screen icons allow you pick to up and manipulate objects, although these controls are awkward to use.

If you're looking for a radical reinvention of swords and sorcery fantasy, better look elsewhere: *Labyrinth of Worlds* is basically a retread of Dungeons and Dragons. But its size and splendor make for a rewarding adventure.

Underworld II welcomes you to the chambers of Lord British. The icons on the lower right let you pick up objects and use them.

Egg-Zackly Right

At first *Contraption Zack* looks simple: It's your first day as a repairman at Gadgetco, but already you're in a world of trouble. There are major malfunctions everywhere, and your fellow workmen have "borrowed" your tools. Your job: Show 'em who's boss!

Zack is built around an elaborate six-level, 60-room maze, but getting through it requires much more than just drawing a map. The heart of *Contraption Zack* is a series of logical puzzles. None of the puzzles requires special equipment, but their very simplicity is what makes them so maddening—and so irresistible. You *know* there's a way to get through the doorway to the next room. If the blue button lowers the blue cones but raises the yellow cones, maybe you can pass the yellow cones first and then....The modular design is also appealing: Once you've beaten one puzzle, you can save the game and go to the next when you're ready.

Graphics are relatively crude—much like an arcade game—and the interface is a bit clunky. Cursor keys move Zack, but sometimes a horizontal key moves him diagonally—and vice versa. Not all the malfunctions are in Zack's puzzle world: The <Esc> key is supposed to display the main menu, but in my experience it didn't always work. Still, an elegance to the game's underlying design makes up for flaws in its controls. *Contraption Zack* is highly appealing, particularly for short coffee breaks.

Straight Into the Trees

It must be the year for golf; quite a few PC golf simulations are reaching the stores. In addition to Fuji Golf (part of Microsoft's *Entertainment Pack 3*, reviewed last month), there's *David Leadbetter's Greens* from MicroProse and *Links 386 Pro* from Access.

Greens is supposed to help you improve your game with play-by-play advice from big-time golf instructor Leadbetter, who says cryptic things such as, "Remember—never up, never in" when you miss a putt. He also reminds you of the importance of proper stance, tee height, club selection, ball spin, and so on. To swing, you click your mouse three times—once to start your backswing, once to start your downswing, and once to choose the instant of contact with the ball. While I find it hard to believe that anything you do with a mouse and your PC will have the slightest effect on what you do with a golf

LINKS 386 PRO SHOWS UP TO FOUR VIEWS. Here, two right-hand frames depict the green and a spy-eye shot of the hole.

club on the fairway, I don't imagine this simulation will do your game any *harm*.

Once you manage to hit the ball, you're rewarded with an incredible array of real-time visuals that follow it as it flies toward the green—or, in my case, straight into the trees. The "camera" angles are marvelous. This part of *Greens* is major fun. You can choose to play against one or more computer-generated opponents, on one of six courses, and in 11 different kinds of games. You can even play against another human being via modem, assuming that you both have copies of the software.

Links 386 Pro from Access shares some important features with *Greens:* You click your mouse to hit the ball, for example. But in most ways it takes a different approach. No on-screen pro gives you advice, and there's less attention to theoretical niceties of form. But the biggest distinction is graphical. *Links* shows you the golf course—including trees, grass, sky, and buildings—at virtually photographic resolution. Moreover, you can display four views at a time, including a high-angle overhead shot from which you can zoom in.

The downside to all of this photo-realism is that it's slow. *Links 386 Pro* can take as long as 30 seconds to repaint the screen after every shot. Nevertheless, when you tee off on *Links'* gorgeous super-VGA rendering of Hawaii's Mauna Kea course (sold separately), you may decide that its breathtaking beauty more than makes up for the slow-motion graphics. Anyway, golfers aren't supposed to be in a hurry.

- **Contraption Zack** $39.95; Mindscape; 800/845-8698
  Reader service no. 600
- **David Leadbetter's Greens** $59.95; MicroProse Software; 410/771-1151
  Reader service no. 601
- **Links 386 Pro** $69.95, Mauna Kea Championship Course $29.95; Access Software Inc.; 800/800-4880
  Reader service no. 602
- **Underworld II—Labyrinth of Worlds** $79.95; Origin; 800/245-4525
  Reader service no. 603

Michael Goodwin is a contributing editor for PC World. *He can be reached as MGOODWIN on PC World Online (see page 10 for more information).* ■

1200-DPI PostScript OUTPUT from an HP®4!

Both for just $2295!

LaserJet® 4 + WinJet™ 1200 =

- 1200-dpi, Camera-Ready Output.
- PostScript™-Language Compatibility.
- The Fastest Windows™ Printing.
- 50 TrueType™ Fonts.
- No More Font Downloading.
- Revolutionary Host-Based Design.

Now you can own them both for one low price. When you combine the new LaserJet 4 with LaserMaster's WinJet 1200 upgrade, you get camera-ready copy plus a host of other amazing features.

Call for the participating dealer nearest you.

LM® LASERMASTER® WINPRINT PRODUCTS DIVISION

800-365-4646 (dept. 33P)

© 1993 LaserMaster Corporation. LaserMaster, the LM logo, and WinJet are trademarks of LaserMaster. All other products are trademarks of their respective holders. Prices available in the U.S. only and subject to change. For European information, call (31) 2503 22000 or (31) 2503 31240.

Circle 156 on reader service card

$50,000 World Class Contest

Oops, you went too far!

Turn back to page 95 and cast your vote for the chance to win a super 486 desktop system and other top-rated hardware and software products FREE!

You pick your dream system—we give it away!

KEY INTO THE FUTURE...

AT PC EXPO TODAY

Travel into the next decade as PC EXPO embarks on an entirely new era of computing. You'll journey into the future of Windows, pen-based computing, multimedia and open systems. You'll tour the more than one-half million square feet of exhibition space showcasing a universe of the latest programs and services. And you'll explore a galaxy of new products that link today's information services with tomorrow's innovative technologies.

Catch a glimpse of the future at PC EXPO

JUNE 29, 30 & JULY 1, 1993

JACOB K. JAVITS CONVENTION CENTER
11th Avenue at 34th Street
New York City

For more information call today!
800-829-3976 ext. 9216

PC EXPO IN NEW YORK

It's the one computer trade event guaranteed to leave you light years ahead of your competition.

BLENHEIM

PC EXPO in New York is produced and managed by Bruno Blenheim Inc.
Fort Lee Executive Park, One Executive Drive, Fort Lee, NJ 07024 • 800-829-3976 • 201-346-1400 • Fax 201-346-1602

& Get Smarter Here!

Look for IDG Books Nationwide at:

B. DALTON
BARNES & NOBLE
BOOKSTOP/BOOKSTAR
CROWN/SUPER CROWN
COMP USA
ENCORE
SOFTWARE ETC.
WALDENBOOKS
WALDENSOFTWARE

Selected Titles Available at:

BIZMART
OFFICE DEPOT
OFFICE MAX
STAPLES

Alaska

FAIRBANKS
Baker & Baker Booksellers
Two locations
JUNEAU
Big City Books

Arizona

PHOENIX
Fast Micro, Inc.
Sho-Tronics

NORTHERN CALIFORNIA

BERKELEY
Cody's Books
MICROWORLD
Moe's Bookstore
Whole Earth Access
CAMPBELL
The Booksellers
CAPITOLA
Capitola Book Cafe
CHICO
Computer Warehouse
Tower Books
CITRUS HEIGHTS
Computers 4 Less
0+G Computers
Tower Books #323
CONCORD
Tower Books
Whole Earth Access
CUPERTINO
A Clean Well Lighted Place For Books
Stacey's
DAVIS
The Avid Reader
U.C.D. Bookstore
EMERYVILLE
Diesel A Bookstore
HAYWARD
Pioneer Bookstore-Cal State Hayward
LARKSPUR
A Clean Well Lighted Place For Books
MENLO PARK
Keplers Books & Magazines
MILL VALLEY
Depot Bookstore & Cafe
MILPITAS
Town Center Book Gallery
MONTEREY
PC People
MORGAN HILL
Town Books of Morgan Hill
MOUNTAIN VIEW
Printers, Inc.
OCEANSIDE
Computer Books For Less
PALO ALTO
Printers, Inc.
Stecey's Bookstore
PETALUMA
Buerg Software & Computers
REDWOOD CITY
Computer Attic
SACRAMENTO
Hornet Bookstore
Tower Books
3 Locations
Whole Earth Access
SALINAS
Computer Works
SAN FRANCISCO
Franciscan Shops
Stacey's–Embarcadero
Stacey's–Market Street
Whole Earth Access
SAN JOSE
Spartan Shops/San Jose State
The Booksellers
Whole Earth Access
SAN MATEO
Tower Books
Whole Earth Access
SAN RAPHAEL
Books Revisted
Whole Earth Access
SANTA CRUZ
Bookshop Santa Cruz
SANTA ROSA
Bits & PCs
SEASIDE
Monterey Bay Computer Works
SONOMA
The Sonoma Computer Store
STOCKTON
Computer Warehouse
Perfect Computer Center
University of the Pacific
SUNNYVALE
Action Computer and Surplus
VACAVILLE
Computer Cite

SOUTHERN CALIFORNIA

ALHAMBRA
Alhambra Bookstore
ARROYO GRANDE
Books West
BAKERSFIELD
Books West
BURBANK
P.C. Book Nook
CLAREMONT
Huntley Bookstore
ESCONDIDO
PC Warehouse Computers
FULLERTON
Titan Shops-Cal State Fullerton
GLENDALE
Computer Palace
IRVINE
Irvine Sci-Tech Books
U.C.I. Bookstore
LOMPOC
Books West
LOS ANGELES
A.S.U.C.L.A. Bookstore
OPAMP Technical Books
U.S.C. Trojan Bookstore
MORENO VALLEY
Minco Computers
PASO ROBLES
Barger Computers
PASADENA
Cal Tech Bookstore
Vroman's Bookstore
RIVERSIDE
Cardinal Computers
U.C.R. Bookstore
SAN DIEGO
Aztec Shops Ltd.
Byte & Floppy Computers
All locations
Byte Gallery
Datel Computers
MicroCity Computers
San Diego Technical Books
S.M.T. Computers
SAN LUIS OBISPO
Books West
Earthling Bookshop
SAN MARCOS
Computer Depot
SANTA ANA
A.C.P. Super Store
SANTA BARBARA
Chaucer's Bookstore
Earthling Bookshop
UPLAND
Software Centre International

Colorado

DENVER
Tattered Cover
ENGLEWOOD
SoftPro Books
COLORADO SPRINGS
Mckinzey-White Booksellers

Connecticut

HARTFORD
Huntington's Bookstore
MANCHESTER
Reed's Bookstore
NEW HAVEN
Yale Coop
STORRS
U Conn Coop

Delaware

NEWARK
University Bookstore

District of Columbia

Reiter's Scientific & Professional Books

Florida

BOCA RATON
Liberties

Georgia

ATLANTA
Chapter Eleven Books
Engineer's Bookstore
Georgia Tech Bookstore
Oxford Bookstore
MARIETTA
Micro Center

Hawaii

HONOLULU
Honolulu Book Shops, Ltd.

Illinois

CHAMPAIGN
Pages For All Ages
CHICAGO
Kroch's & Brentano's
DEKALB
Junction Book Store

NEW ENGLAND

All locations:
Lauriat's
Royal Discount Bookstores

Massachusetts

BOSTON
Boston University Bookstore
Museum of Science
Waterstone's
BROOKLINE
Brookline Booksmith
BURLINGTON
SoftPro Books
CAMBRIDGE
Accessories Plus
Harvard Coop
MIT Coop
Quantum Books
Wordsworth
WALTHAM
Maple Book Co.
WORCESTER
Tatnuck Booksellers & Sons

Minnesota

MINNEAPOLIS
Baxter's Books
ST. PAUL
Odegard Books

Missouri

ST. LOUIS
Software Plus
The Library, Ltd.

New Mexico

ALBUQUERQUE
Page One Newsstand

New York

ALBANY
Book House of Stuyvesant Plaza
HUNTINGTON
Book Revue
NEW YORK
Barnes & Noble/E. 18th St.
Classic Bookshop
Computer Book Works
Cooper Square Books
New York University Book Center

New Jersey

CLINTON
Clinton Bookshop

Ohio

COLUMBUS
Micro Center
MAYFIELD HEIGHTS
Micro Center
SHARONVILLE
Micro Center
WESTERVILLE
Micro Center

Oregon

CORVALLIS
OSU Bookstores
EUGENE
Libra Books/Book Mark
PORTLAND
Powells Technical Bookstore
Tower Books
SALEM
Jecksons Books

Pennsylvania

KING OF PRUSSIA
Gene's Books
PHILADELPHIA
Quantum Books
ST. DAVIDS
Micro Center

Rhode Island

PORTSMOUTH
Mac & PC Shop
PROVIDENCE
Brown University Bookstore
WARWICK
Software Center of Rhode Island

Texas

Taylors
All stores

Virginia

FAIRFAX
Micro Center

Washington

BELLEVUE
Tower Books
SEATTLE
Elliot Bay Book Co.
Tower Books

Wisconsin

APPLETON
Conkey's Bookstore
MILWAUKEE
Harry W. Schwartz Bookshop

CANADA

All locations:
SMITHBOOKS
Coles Bookstores
The Book Company
ALBERTA
All locations:
London Drugs
Overwaitea/SaveOn Foods
EDMONTON
Edmonton Computer Books
Audrey's Books
Softwarehouse (West) Inc.
Greenwood's Bookshoppe Ltd.
CALGARY
Calgary Computer Books
The Knowledge Source

British Columbia

All locations:
London Drugs
Overwaitea/SaveOn Foods
VICTORIA
Bolen's Books
Munro's Book Store
VANCOUVER
Siliconnections Books
Granville Book Co.
Duthies Books

Saskatchewan

REGINA
Book & Brier
Golden Mile Plaza

Manitoba

WINNIPEG
Copperfield's Computer Books

Quebec

MONTREAL
Camelot Info-Place Ville Marie
Camelot Info-Place Phillips
Coles 100

Ontario

TORONTO
Arkon Electronics
University of Toronto Bookstore
World's Biggest Bookstore
Classroom Computers
Computronix Data Center
OTTAWA
Odyssey Computer Books & Software
The Book Co.

Nova Scotia

HALIFAX
The Book Co.
Roswell Computer Books

IDG BOOKS

The World of Computer Knowledge

Look for IDG Books at these fine stores, or for more information call

1-800-762-2974

Get Smart!

For Dummies™ Books from IDG: The Fun and Easy Way to Learn About Computers

Lighthearted, down-to-earth, and packed with valuable information, For Dummies books are the perfect survival guides for anyone forced to use a computer!

"...The best book ever written for a beginner." — *The Chicago Tribune*

COMPUTER BOOK SERIES FROM IDG

OVER 3,503,266 DUMMIES BOOKS IN PRINT!

DOS For Dummies, 2nd Ed.™
by Dan Gookin
1-878058-75-4
$16.95 US/$21.95 Canada

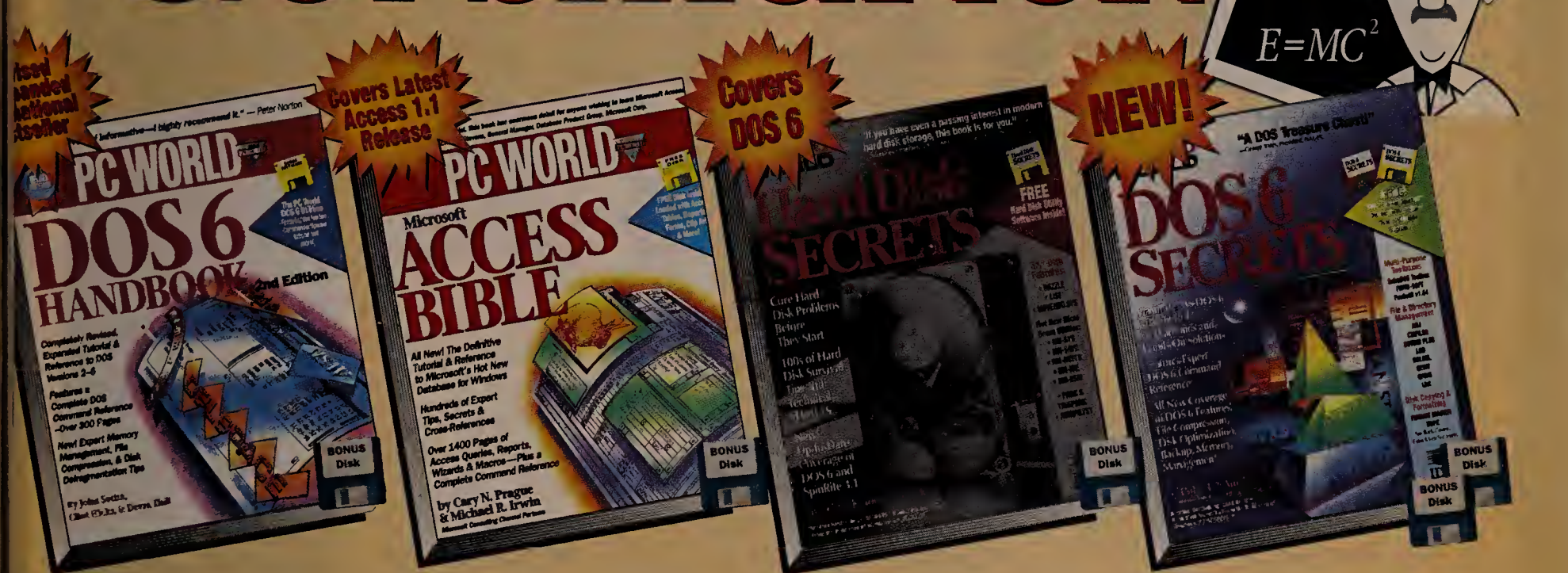
Windows For Dummies™
by Andy Rathbone
1-878058-61-4
$16.95 US/$21.95 Canada

WordPerfect For Dummies™
by Dan Gookin
1-878058-52-5
$16.95 US/$21.95 Canada

PCs For Dummies™
by A. Rathbone & D. Gookin
1-878058-51-7
$16.95 US/$21.95 Canada

1-2-3 For Dummies™
by Greg Harvey
1-878058-60-6
$16.95 US/$21.95 Canada

Get Smarter!



PC World DOS 6 Handbook, 2nd Edition
by John Socha, Clint Hicks, & Devra Hall
Master DOS with this complete tutorial and reference to DOS Versions 2–6. Features a complete DOS Command Reference, plus expert advice on the new DOS 6 features. Includes over a dozen DOS utilities on disk, including Norton Commander Special Edition.
1-878058-79-7
$34.95 US/$44.95 Canada,
Includes one 3 ½" disk

PC World Microsoft Access Bible
by Cary Prague & Michael Irwin
Let database experts Cary Prague and Michael Irwin give you the key to Microsoft's hot new database for Windows! A complete tutorial and reference with lots of expert tips and techniques. Includes a complete, customizable database application on disk.
1-878058-81-9
$39.95 US/$52.95 Canada,
Includes one 3 ½" disk

Hard Disk SECRETS™
by John M. Goodman, Ph.D.
Cure hard disk problems before they start with this indispensable book/disk. Features 100s of hard disk survival tips and SECRETS, with up-to-date coverage of DOS 6 and SpinRite 3.1. Includes FREE disk of hard disk utility software, hand-picked by the author.
1-878058-64-9
$39.95 US/$52.95 Canada,
Includes one 3 ½" disk

DOS 6 SECRETS™
by Robert Ainsbury
Optimize DOS 6 for maximum performance with this treasure chest of SECRET DOS workarounds, tips, & hands-on solutions. All new coverage of DOS 6 file compression, disk optimization, defragmentation, and memory management. Includes two 3 ½" disks of "Bob's Better Than DOS" shareware —over 25 utilities!
1-878058-70-3
$39.95 US/$52.95 Canada,
Includes two 3 ½" disks

Let IDG's Authorized Editions show you how to make the most of your computer. Find them at your local book or computer store or call: 1-800-762-2974.
In Canada, call Macmillan of Canada at 416-293-8141.

For Dummies and SECRETS™ are trademarks of IDG Books Worldwide, Inc.

IDG Books Worldwide
155 Bovet Road
San Mateo, CA 94402
415 312-0600

IDG BOOKS

The World of Computer Knowledge

Uninstallium Practicalus

Remember the good old days? Every DOS program came with a convenient, free, easy-to-use uninstall routine—DEL *.*. A really complicated operation might've involved removing a directory and deleting some lines from your AUTOEXEC or CONFIG files, but that was as difficult as it got.

Well, Bunky, if you've switched to *Windows*, you know those days are over. Many *Windows* applications install themselves into half a dozen new directories scattered across your hard disk, add a heap of new DLL files to your WINDOWS directory, and insert dozens of new lines into WIN.INI.

Hope, I'm glad to say, has sprung, in the form of some smart utilities that'll rid your computer of unwanted *Windows* programs—along with their bazillion unidentified support files. And as a fringe benefit, you'll get a better grasp on how *Windows* works.

The highest marks go to MicroHelp's *The UnInstaller*, a brilliant utility that cleans up after an application as it removes it. When you select a program, detailed analysis lets you know where the program and help files reside, if the program has its own INI file, and which Program Manager icons exist. The $79 *UnInstaller* also ferrets out DLLs and items added to WIN.INI. Then with just a click of the mouse, they're gone. *Adios. Hasta luego.*

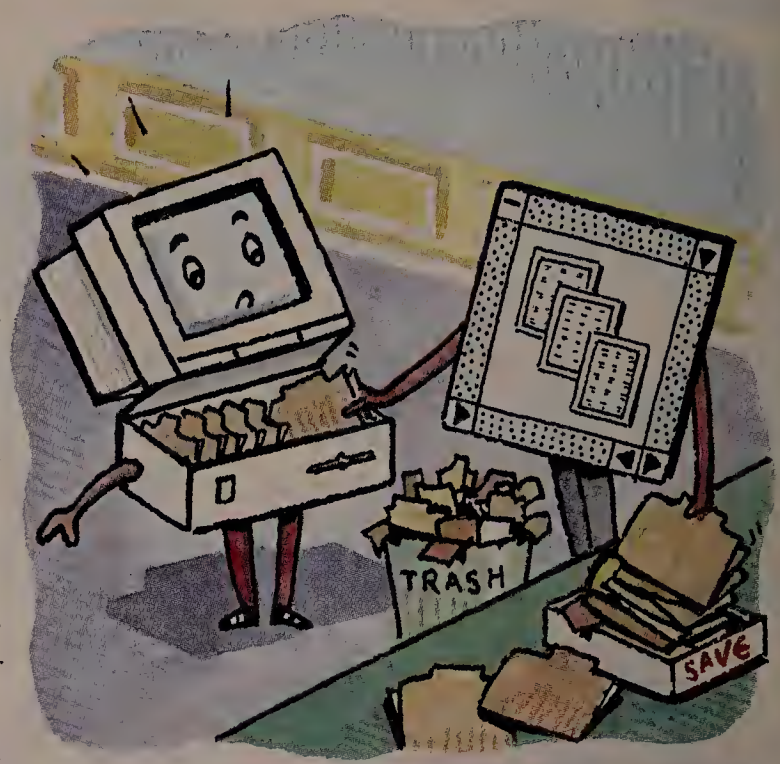
Windows Without a Clue

Because I don't have a clue about half of those files in my *Windows* directory, I was reticent about using *The UnInstaller*, afraid I might unintentionally delete something I need. Not a chance—*The UnInstaller* has more safeguards than a monitor has pixels. For example, it has a reassuring "Confirm all Deletions" choice and it's smart enough to stop you from uninstalling essential *Windows* programs like PIFEDIT or WINFILE. After it's done, *The UnInstaller* can report on what items it removed and what you didn't allow it to remove. Using *The UnInstaller*'s browse mode, I was able to get rid of more than 5MB of long-unused *Windows* programs that I'd forgotten I even owned. Now if the utility could only remove the excess DLLs left from applications I erased before I got *The UnInstaller*.

If you're looking for a bargain, and are willing to do more work to earn it, you can use *Uninstall for Windows*. You must run this program before and after you install a new *Windows* app, letting it take a snapshot of your entire system. The program can then compare the "old" system to the "new" so you'll know what's changed. *Uninstall for Windows*, available as UN4WIN.ZIP on PC World Online and other on-line services, isn't particularly elegant. But it's only $19, and it's try-before-you-buy shareware.

A Back Door to Windows

Using *The UnInstaller* had an unexpected advantage: It gave me a glimpse into the inner workings of *Windows*. I now know, for example, which DLLs are shared by multiple programs and how many programs create their own INI files. This sparked my curiosity. To learn more about *Windows* (and do some safe tinkering) I started playing with a pre-release copy of Windows User Group Network's *System Engineer*, an incredibly comprehensive utility that lets me snoop into—and modify—just about every part of *Windows*. Among other things, I was able to explore my *Windows* communications setup, tweak my 386 memory settings, and even set a log to record the last 100 changes to my system. Being a bit fainthearted, I was glad that *System Engineer* has an option to let me experiment without any chance of doing harm.



If *System Engineer* had nothing but its help and tutorial files and its ability to troubleshoot a problem, it would still be worth the price. The Help system includes not only a comprehensive glossary and flowchart of *Windows* functions, but took me on an amazing tour of *System Engineer*'s own options. And as for troubleshooting, the WUGNET program easily helped me solve a problem I had been experiencing with the mouse when I was in windowed DOS programs.

It's June, time for garage sales and weeding the yard. With programs like these, you can clean your *Windows* too.

Contributing Editor Steve Bass is the president of the Pasadena IBM Users Group. He can be reached as PCW STEVE on PC World Online (see page 10 for more information).

By Steve Bass

MICHAEL SLOAN

WHERE TO BUY

Uninstall for Windows $19, It's Your Money Inc.; CIS 72621,2222; America Online "IYM."
Reader service no. 722

The UnInstaller $79, MicroHelp Inc.; 800/922-3383, 404/516-0899, 404/516-1099 (fax).
Reader service no. 723

System Engineer $49.95 (free with WUGNET membership), Windows User Group Network; 215/565-1861, 251/585-7016 (fax).
Reader service no. 724

$999. NO, IT'S NOT A TYPO.

(SORRY COMPAQ.)

SAVE $200

DELL PERFORMANCE SERIES 333s/L
BUSINESS LEASE: $37/MO.

Contrary to many systems you see advertised for under $1,000, ours comes complete with a VGA color monitor (14", 640 x 480, .31mm). Plus an 80MB hard drive. Plus 2MB RAM. Plus one diskette drive. Plus MS-DOS, Microsoft® Windows 3.1, and a mouse. Plus 3 ISA expansion slots. Plus 256KB video RAM. Quite a few pluses, wouldn't you say?

CALL AND ORDER TODAY. OFFER EXPIRES 6/30/93.

There's no mistake about it. For a limited time only, you can get the fastest Dell 386SX made for under $1,000. (That means you'll save up to $200.) And it comes complete with a VGA color monitor.

intel inside®

What's more, you also get guaranteed on-site service,[Δ] and technical support 24 hours a day, 7 days a week—with guaranteed telephone response in under five minutes.[*] All of which shouldn't surprise you since we were the winner of the latest Dataquest®[†] Customer Satisfaction Survey, helping us to become the world's third largest industry-standard PC company.

Speaking of fast, take advantage of our quick shipment program. That way you can receive your new system within three days of ordering it.

So call and order today. Offer expires 6/30/93. Which is one thing in this ad Compaq will be happy to hear.

DELL™

800-433-7309

WHEN CALLING, PLEASE REFERENCE **#11DAZ**.
HOURS: 7AM-9PM CT MON-FRI,
8AM-4PM CT SAT, 10AM-3PM CT SUN.

WE'RE MAKIN
THEY'RE CHECK

	DELL 425s/L	COMPAQ ProLinea 4/25s
UPGRADEABLE TO PENTIUM TECHNOLOGY	✔	
FLASH ROM BIOS	✔	
FLASH ROM EMBEDDED DIAGNOSTICS	✔	
128KB EXTERNAL CACHE OPTION	✔	
MODULAR CHASSIS DESIGNED FOR EASY SERVICEABILITY	✔	
64MB MAXIMUM RAM ON SYSTEM BOARD	✔	
LOW PROFILE CHASSIS WITH 3 DRIVE BAYS AND 3 ISA EXPANSION SLOTS	✔	✔
GUARANTEED* NEXT-BUSINESS-DAY ON-SITE SERVICE	✔	
UP TO 1MB VIDEO RAM	✔	✔

*Guarantees available in USA only for registered owners of Dell Performance Series systems purchased after 7/1/92. For a complete copy, please call our TechFax℠ line at 1-800-950-1329 or write Dell USA L.P., 9505 Arboretum Blvd., Austin TX 78759-7299. Attention Guarantees. †Source: Dataquest, Inc., 1992. •Prices valid in U.S. only. Some products and promotions not available in Canada or Mexico. ◊Leasing arranged by Leasing Group, Inc. ΔOn-site service provided by BancTec Service Corporation. On-site service may not be available in certain remote areas. The Intel Inside logo is a registered trademark and i386, i486 and Pentium are trademarks of Intel Corporation. MS-DOS and Microsoft are registered trademarks of Microsoft Corporation. Dell disclaims proprietary interest in the marks and names of others. ©1993 Dell Computer Corporation. All rights reserved.

G A LIST AND
ING IT TWICE.

Buy any Dell system and we'll install your software right at our factory. It's called Dell ReadyWare.℠ With 20 diskettes and 2 hours to load and configure just one system, imagine the time you'll save and the hassles you'll avoid. In fact, we have over 50 competitively priced popular software applications to choose from.

Just order MS-DOS 6.0, Microsoft Windows 3.1 (for Windows applications), and your ReadyWare choices when you order your Dell Performance Series system.

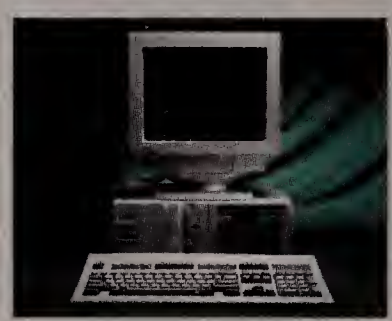
ReadyWare™

We'll install as many applications as you need for just $15. So make a note of it.

THE DELL 333s/L
i386™ SX 33MHz SYSTEM
$999*
BUSINESS LEASE: $37/MO.
2MB RAM
80MB (17ms) HARD DRIVE
3 ISA EXPANSION SLOTS
256KB VIDEO RAM
VGA COLOR PLUS
(14", 640 x 480, .31mm)
ONE DISKETTE DRIVE
(3.5" or 5.25")
MS-DOS 6.0
MICROSOFT WINDOWS 3.1
MOUSE

*WHILE SUPPLIES LAST.

THE DELL 450/L
i486 DX2 50MHz SYSTEM
$2,299
BUSINESS LEASE: $85/MO.
4MB RAM
230MB (17ms) HARD DRIVE
FLASH ROM EMBEDDED DIAGNOSTICS
3 ISA EXPANSION SLOTS
UPGRADEABLE TO
PENTIUM TECHNOLOGY
ACCELERATED LOCAL BUS
VIDEO WITH 1MB VIDEO RAM
ULTRASCAN 14C MONITOR
(14", 1024 x 768, .28mm, NI)
ONE DISKETTE DRIVE
(3.5" or 5.25")
MS-DOS 6.0



THE DELL 450/M
i486 DX2 50MHz SYSTEM
$2,499
BUSINESS LEASE: $92/MO.
4MB RAM
170MB (17ms) HARD DRIVE
128KB EXTERNAL CACHE
FLASH ROM EMBEDDED DIAGNOSTICS
6 ISA EXPANSION SLOTS
UPGRADEABLE TO
PENTIUM TECHNOLOGY
ACCELERATED LOCAL BUS
VIDEO WITH 512KB VIDEO RAM
ULTRASCAN 14C MONITOR
(14", 1024 x 768, .28mm, NI)
ONE DISKETTE DRIVE
(3.5" or 5.25")
MS-DOS 6.0

THE DELL 466/ME
i486 DX2 66MHz SYSTEM
$3,599
BUSINESS LEASE: $130/MO.
8MB RAM
450MB (12ms) HARD DRIVE
128KB EXTERNAL CACHE
FLASH ROM EMBEDDED DIAGNOSTICS
2 ISA EXPANSION SLOTS
4 EISA EXPANSION SLOTS
UPGRADEABLE TO
PENTIUM TECHNOLOGY
ACCELERATED LOCAL BUS VIDEO
WITH 1MB VIDEO RAM
ULTRASCAN 14C MONITOR
(14", 1024 x 768, .28mm, NI)
ONE DISKETTE DRIVE
(3.5" or 5.25")
MS-DOS 6.0

THE DELL 425s/L
i486 SX 25MHz SYSTEM
$1,599
BUSINESS LEASE: $59/MO.

4MB RAM • 170MB (17ms) HARD DRIVE • FLASH ROM EMBEDDED DIAGNOSTICS • UPGRADEABLE TO PENTIUM TECHNOLOGY • ACCELERATED LOCAL BUS VIDEO WITH 512KB VIDEO RAM • ULTRASCAN 14C MONITOR (14", 1024 x 768, .28mm, NI) • DUAL DISKETTE DRIVES (3.5" AND 5.25") • MS-DOS 6.0/MICROSOFT WINDOWS/MOUSE

PROMOTIONAL PRICE: OFFER EXPIRES 7/31/93

DELL™

800-433-7830

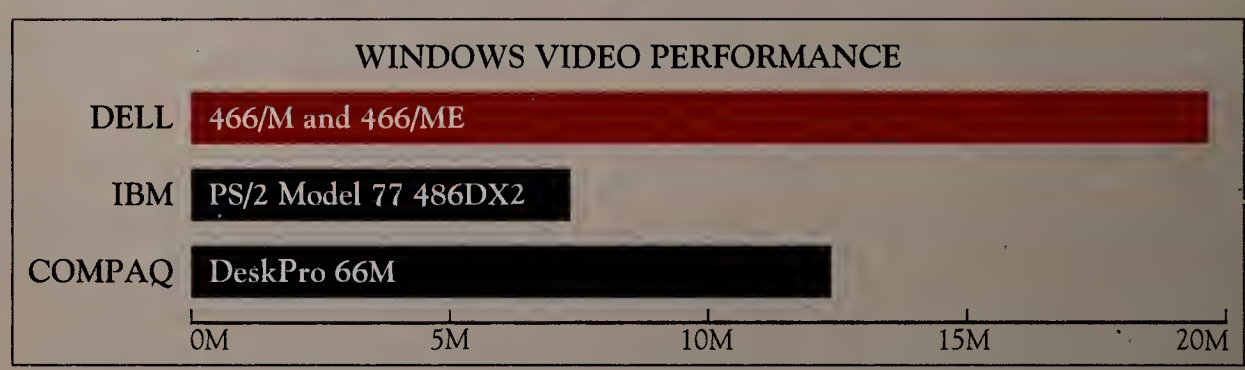
WHEN CALLING, PLEASE REFERENCE **#11DBA**.

HOURS: 7AM-9PM CT MON-FRI, 8AM-4PM CT SAT, 10AM-3PM CT SUN.

IN CANADA, CALL 800-668-3021.

MANY OTHER CONFIGURATIONS AVAILABLE. CALL YOUR DELL REPRESENTATIVE FOR DETAILS.

COMPAQ'S AND IBM'S VIDEO IS BEHIND THE TIMES.



Performance measured by running WINBENCH version 3.1 at 640 x 480, 256 colors. Results measured in millions of WINMARKS. Results for IBM and Compaq as published by PC Magazine in issue dated January 26, 1993. Results for Dell 466/M and 466/ME provided by Dell Performance Measurement Lab, January 1993. DeskPro 66M configured with 8MB RAM, 210MB IDE HD, QVision 1024/E controller with 1MB VRAM. PS/2 model 77 486DX2 configured with 8MB RAM, 400MB SCSI HD, XGA-2 with 1MB VRAM and 256KB cache. 466/M and 466/ME both configured with 8MB RAM, 170MB IDE HD, local bus video with 1MB VRAM, and 128KB cache.

Our Dell 466/M and 466/ME with over 19 million WINMARKS, outran the Compaq DeskPro 66M with QVision and IBM PS/2 Model 77 486 DX2 with XGA-2. That means we're up to 57% faster than QVision and up to 174% faster than XGA-2. Thanks, of course, to our accelerated local bus video and fast drivers for Windows applications. Both help put the Dell® 466/M a little ahead of its time.

THE DELL 466/M i486™ DX2 66MHz SYSTEM

$3,149

BUSINESS LEASE◊: $117/MO.

8MB RAM • 230MB (17ms) HARD DRIVE • 128KB EXTERNAL CACHE • FLASH ROM EMBEDDED DIAGNOSTICS • 6 ISA EXPANSION SLOTS • UPGRADEABLE TO PENTIUM™ TECHNOLOGY • ACCELERATED LOCAL BUS VIDEO WITH 1MB VIDEO RAM • ULTRASCAN™ 14C MONITOR (14", 1024 x 768, .28mm, NI) • ONE DISKETTE DRIVE (3.5" OR 5.25") • MS-DOS® 6.0

OR CHOOSE THE 466/ME EISA SYSTEM FOR ONLY $200 MORE

800-433-7308

WHEN CALLING, PLEASE REFERENCE **#11DF3**.

HOURS: 7AM-9PM CT MON-FRI, 8AM-4PM CT SAT, 10AM-3PM CT SUN.

IN CANADA, CALL 800-668-3021. IN MEXICO CITY, 228-7811.